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PERSONAL COMPUTING

MARCH 1987 A Hayden Publication

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- ✓ Compile, run-time, and I/O errors place you in the source code where error occurred
- ✓ New long integer (32-bit) data type
- ✓ Full 80-bit precision
- ✓ Pull-down menus
- ✓ Full window management

System requirements

IBM PC, XT, AT and true compatibles, PC-DOS (MS-DOS) 2.0 or later. One floppy drive, 256K.

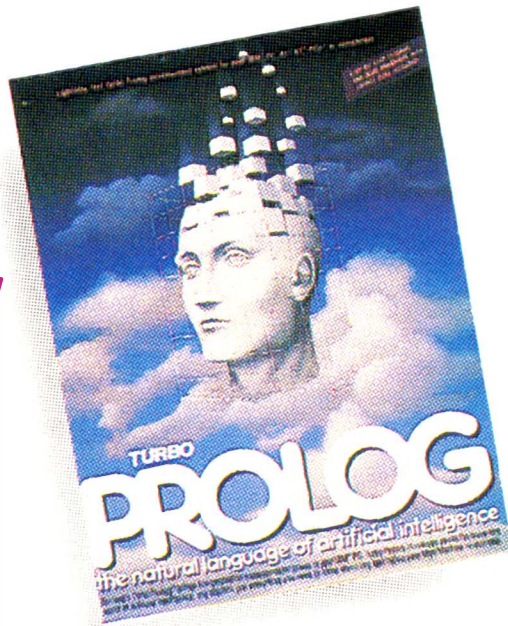
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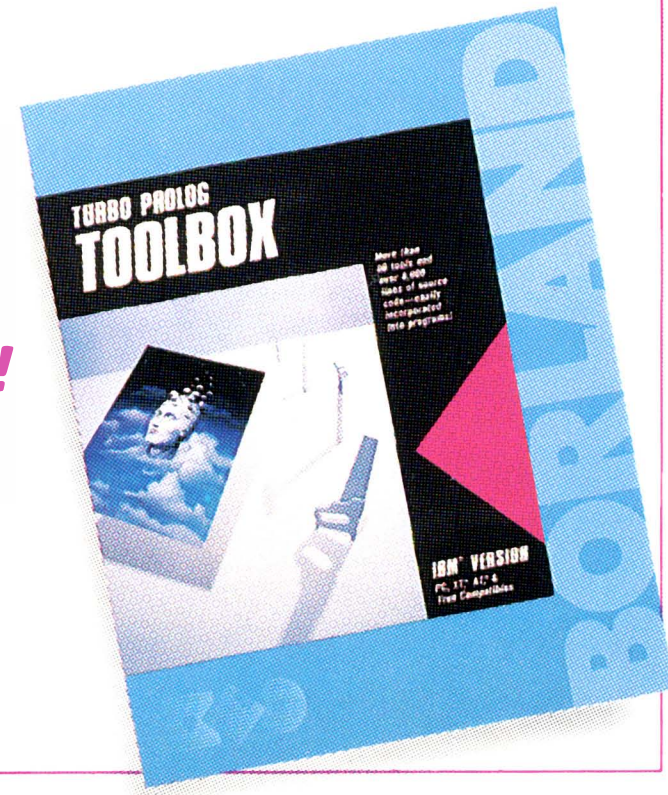
- ✓ Business graphic generation
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System requirements

Turbo Prolog: IBM PC, XT, AT or true compatibles. PC-DOS (MS-DOS) 2.0 or later. 384K. Turbo Prolog Toolbox requires Turbo Prolog 1.10 or higher. Dual-floppy disk drive or hard disk. 512K.

It's the complete developer's toolbox and a major addition to Turbo Prolog. You get a wide variety of menus—pull-down, pop-up, line, tree and box—so you can choose the one that suits your application best. You'll quickly and easily learn how to produce graphics; set up communications with remote devices; read information from Reflex, dBASE III, Lotus 1-2-3 and Symphony files; generate parsers and design user interfaces. All of this for only \$99.95.

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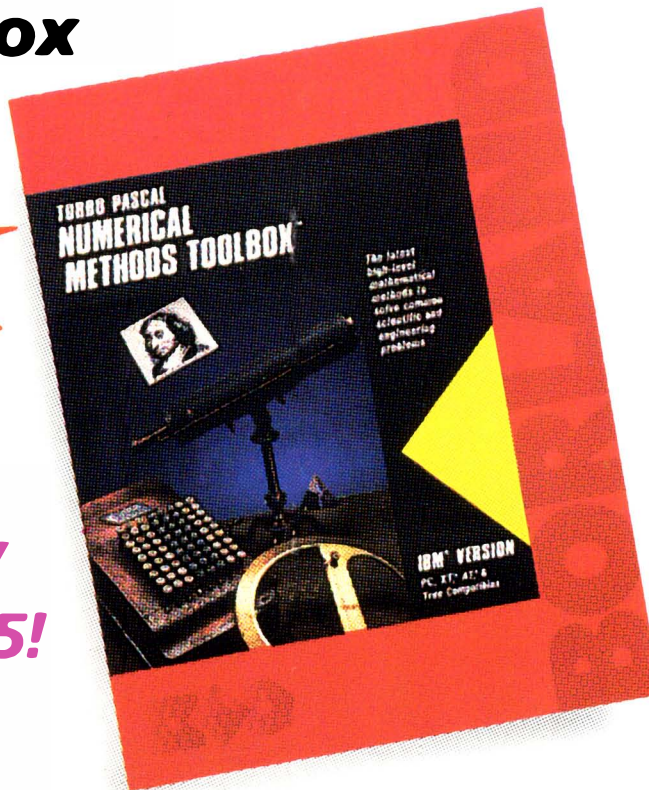


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System requirements

IBM PC, XT, AT or true compatibles. PC-DOS (MS-DOS) 2.0 or later. Turbo Pascal 2.0 or later. Graphics module requires graphics monitor with IBM CGA, IBM EGA, or Hercules compatible adapter card, and requires Turbo Graphix Toolbox. 8087 or 80287 numeric co-processor not required, but recommended for optimal performance. 256K.

Turbo Pascal 3.0.

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System requirements

IBM PC, XT, AT and true compatibles. PC-DOS (MS-DOS) 2.0 or later. One floppy drive. 320K.

Technical Specifications

- ✓ **Compiler:** One-pass compiler generating linkable object modules and inline assembler. Included is Borland's high performance "Turbo Linker." The object module is compatible with the PC-DOS linker. Supports tiny, small, compact, medium, large, and huge memory model libraries. Can mix models with near and far pointers. Includes floating point emulator (utilizes 8087/80287 if installed).
- ✓ **Interactive Editor:** The system includes a powerful, interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code.
- ✓ **Development Environment:** A powerful "Make" is included so that managing Turbo C program development is highly efficient. Also includes pull-down menus and windows.
- ✓ **Links with relocatable object modules** created using Borland's Turbo Prolog into a single program.
- ✓ **ANSI C compatible.**
- ✓ **Start-up routine source code included.**
- ✓ **Both command line and integrated environment versions included.**

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Sieve benchmark (25 iterations)

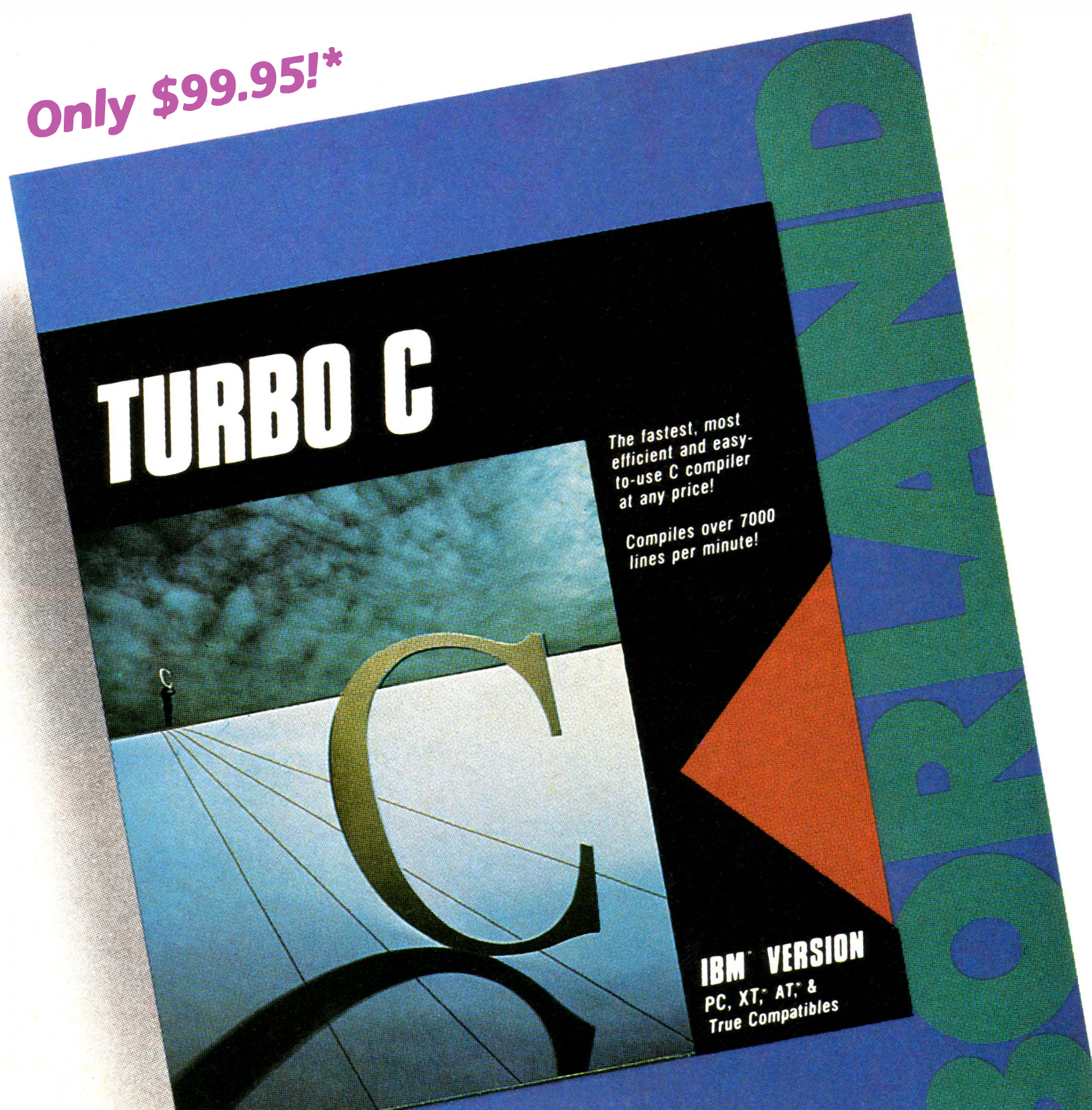
	Turbo C	Microsoft® C	Lattice C
Compile time	3.89	16.37	13.90
Compile and link time	9.94	29.06	27.79
Execution time	5.77	9.51	13.79
Object code size	274	297	301
Price	\$99.95	\$450.00	\$500.00

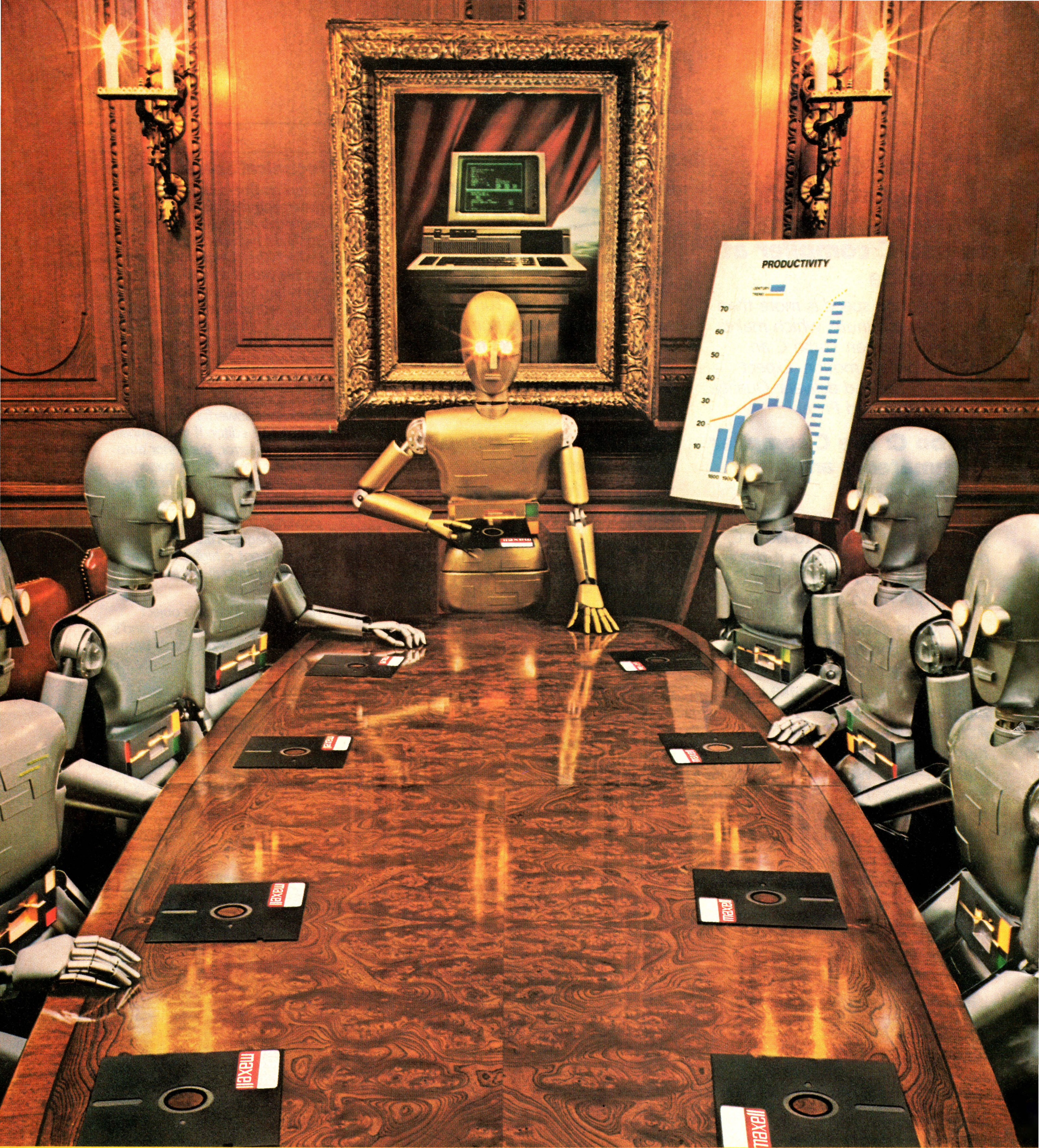
Benchmark run on a 6 Mhz IBM AT using Turbo C version 1.0 and the Turbo Linker version 1.0; Microsoft C version 4.0 and the MS overlay linker version 3.51; Lattice C version 3.1 and the MS object linker version 3.05.

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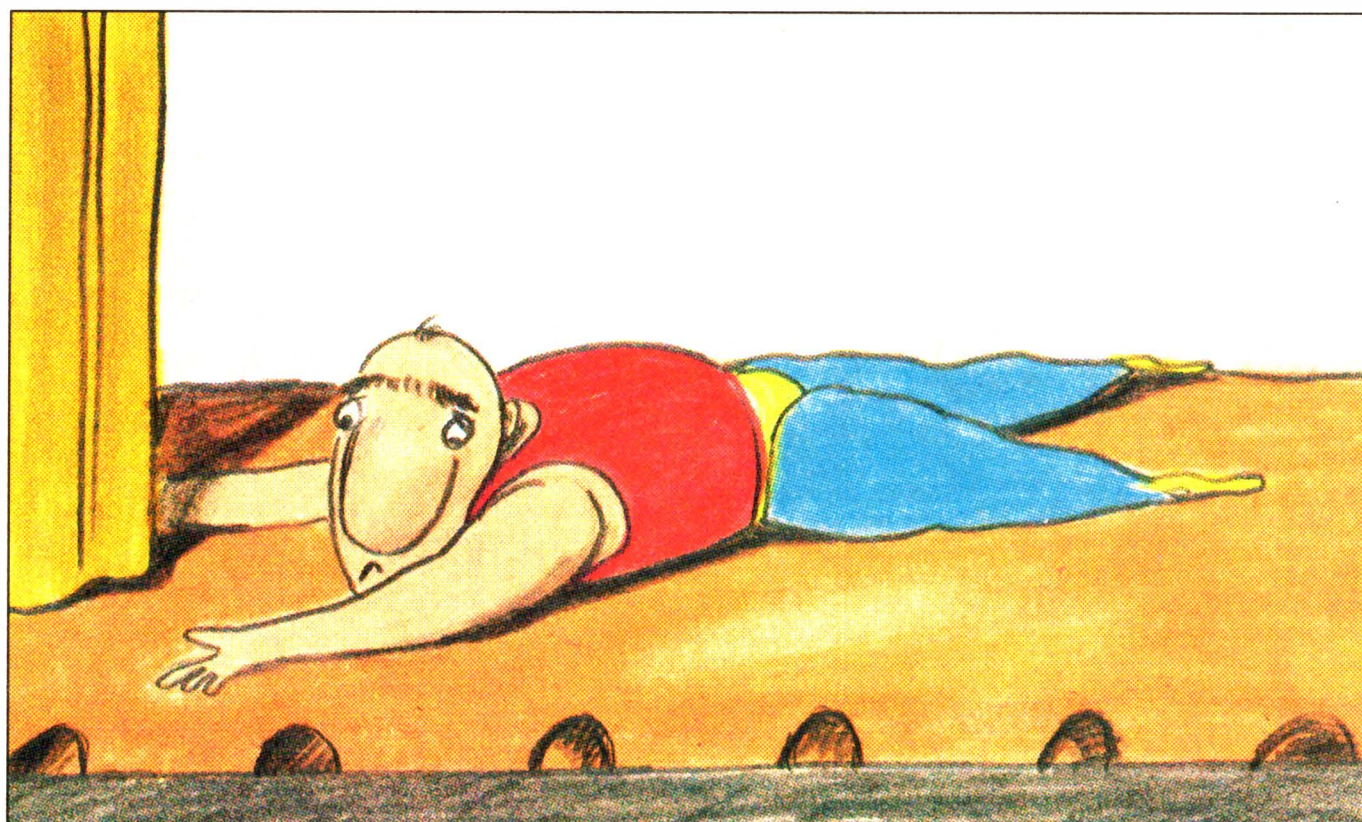
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RAM Residents

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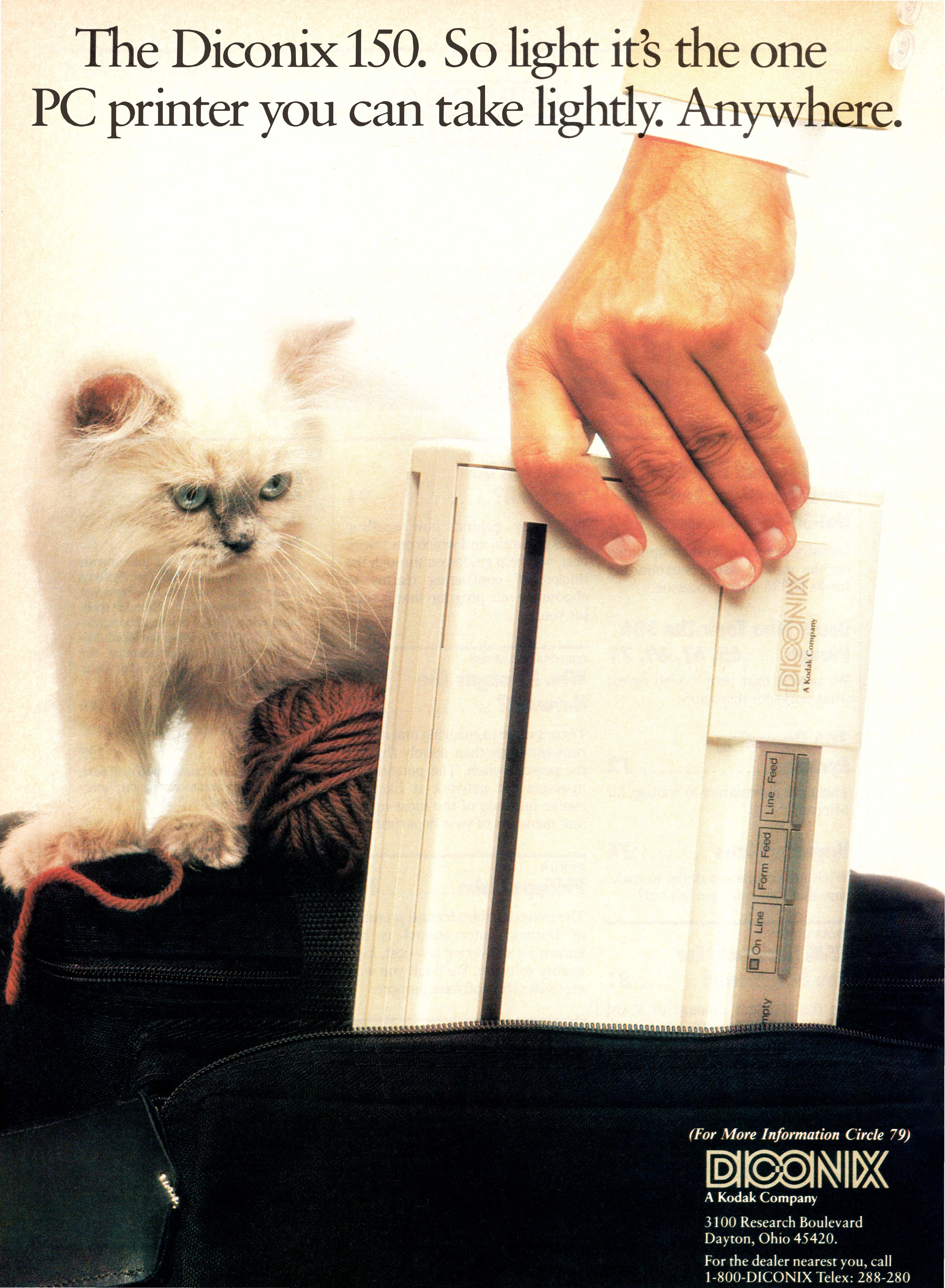
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EDITOR'S NOTE

Embarking On Our Future

When I consider the developments we are all anticipating in the personal computing field this year, I can't help but recall the foreboding words of Bette Davis in the movie "All About Eve": "Fasten your seat belts, it's going to be a bumpy night." When you recognize that, at this writing, second-guessing IBM is virtually a national pastime among personal computer users and makers, rampant cloning is forcing prices to all-time lows (a 20Mb XT-class compatible with monitor was advertised recently in New York for under \$1,000), the Macintosh has been born again, and local area networks, mainframe links, and other "connectivity" schemes are actually viable enough to link heretofore disparate worlds of computing, then you, too, might be inclined to see the appropriateness of Davis' words.

To my mind, no areas in personal computing demonstrate more potential and peril than the coming 80386 generation of computers and the introduction of a new operating system from Microsoft (whatever-DOS—pick your own moniker). These are bold steps that will steadily advance and affect the marketplace in the coming months. Yet until now, the issues surrounding this new technology have been characterized as a confusing set of tough questions without readily apparent answers. To these questions and answers we have applied our energies in this month's Special Report. By no means do we pretend to have wrought a definitive picture; one simply doesn't exist. But we think we've anticipated your fears, concerns, and confusion, and we expect that you'll find a reliable accounting of the possibilities in store.

What is really happening here is a burst of energetic technology development that is welcome and applauded after the snail's pace (at least in comparison to earlier years) of progress in the recent past. Change never comes easily, however, and the prospect of it naturally fills one with trepidation. Will you have to revamp systems you spent long hours and energy to build, to tap the new technology? Will you see an incremental or a quantum leap in productivity, performance, or whatever it is you measure the benefits of computing by? The most optimistic answers to these and other questions are distinctly possible. And yet we all know that even on the most direct path to progress, chaos is a momentary reality.

A cautionary note here. Though we may have steeled ourselves for a period of change, shouldn't we seek to do a better job this time around than we did in the past? While the fundamental technology of computing keeps promising to make the process easier, aren't the insulated concerns of competing industry forces working against the implementation of those promises in an orderly fashion? So many in the industry are fond of calling their firms solutions-oriented. Wouldn't it make as much sense—good business sense—to address solutions to the problems of business rather than the problems of computing? If this industry is on the verge of a mature resurgence, as it seems to be, this is one requisite that we'll be looking for as part of the coming generation of 386 computers and advanced operating systems. I, for one, would like to loosen my seat belt a notch or two.



FRED ABATEMARCO, EDITOR-IN-CHIEF



BOB WALLACE **PC-WRITE 2.7**

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- *Phone book* compiles names, addresses and phone numbers—and can even dial your phone.
- *Calculator* includes memory and financial functions.

- *Notepad* lets you jot down quick ideas and memory-joggers you can retrieve at the touch of a button.
- *Editor* creates business letters and spreadsheet reports, and allows you to view and edit existing files.
- *List manager* orders daily tasks, and effectively segments/tracks “to do” lists.
- *Watch* helps you keep records of time spent on as many as 100 different projects.
- *DOS file manager* executes DOS commands from within applications.
- *Kaleidoscope* specifies colors on your screen, *Configuration* lets you build the product that best fits the way you work, *Special characters* contain a full 256 character IBM extended ASCII table.
- And *Macros* let you turn even your most complicated multi-step tasks into one-step commands.

High Quality... Total Compatibility.

Metro is built to the high quality standards of 1-2-3 and Symphony—so it won't endanger your data. Metro is unprotected, so it's easy to install and easy to use. And it can be easily removed from memory whenever you need more room for your spreadsheet or other functions.

As a member of the Lotus family, Metro is the management program best suited—and designed—to work with other Lotus products. And it comes complete with Lotus' unparalleled commitment to customer service, reliability and support.

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System Requirements:

IBM® PC, XT, Portable, AT, COMPAQ® Portable, PLUS, DESKPRO. Two 5.25" double-sided disk drives (hard disk recommended for optimal performance). Minimum of 80K required for RAM-resident portion of Metro. DOS 2.0 or higher. Metro is unprotected and can be removed from memory.

Lotus Metro runs with a wide variety of software programs, including 1-2-3® Symphony,® Symphony Spelling Checker, Symphony Text Outliner, 1-2-3 Report Writer,™ and Signal.™

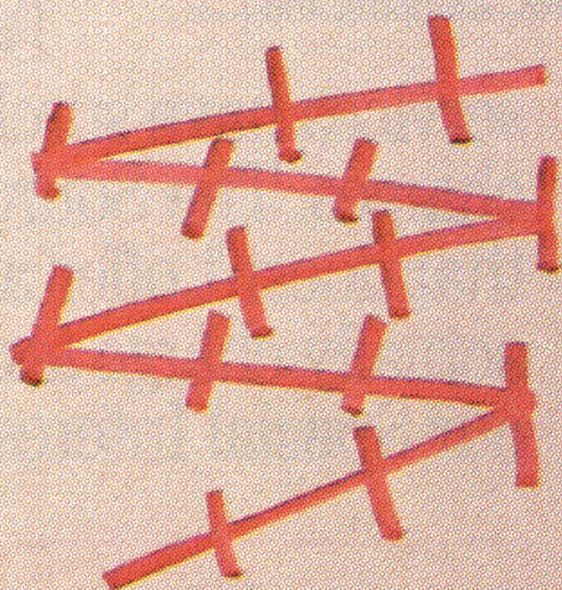
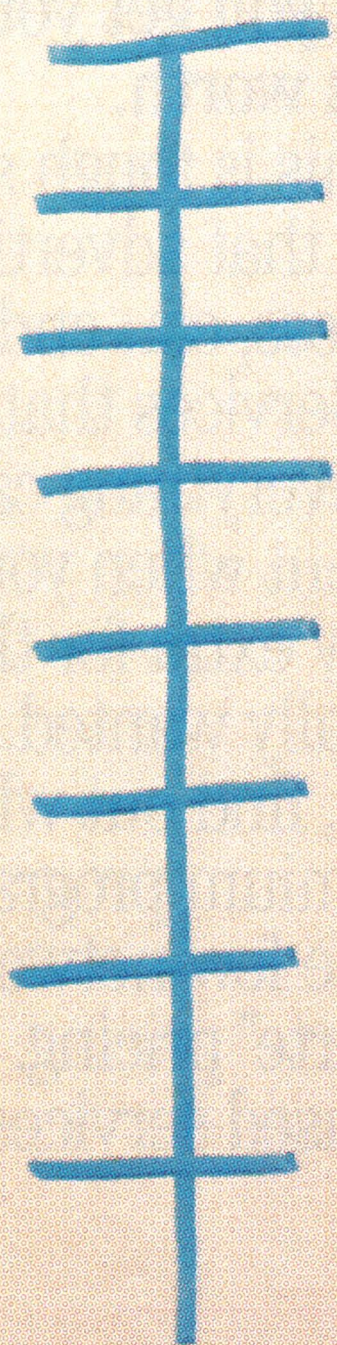
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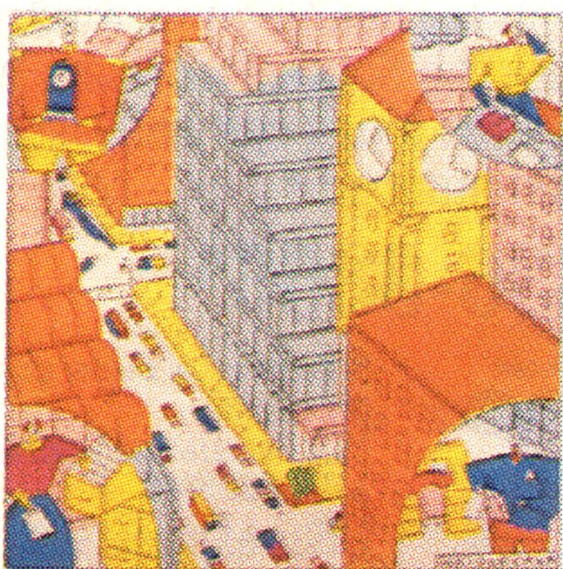


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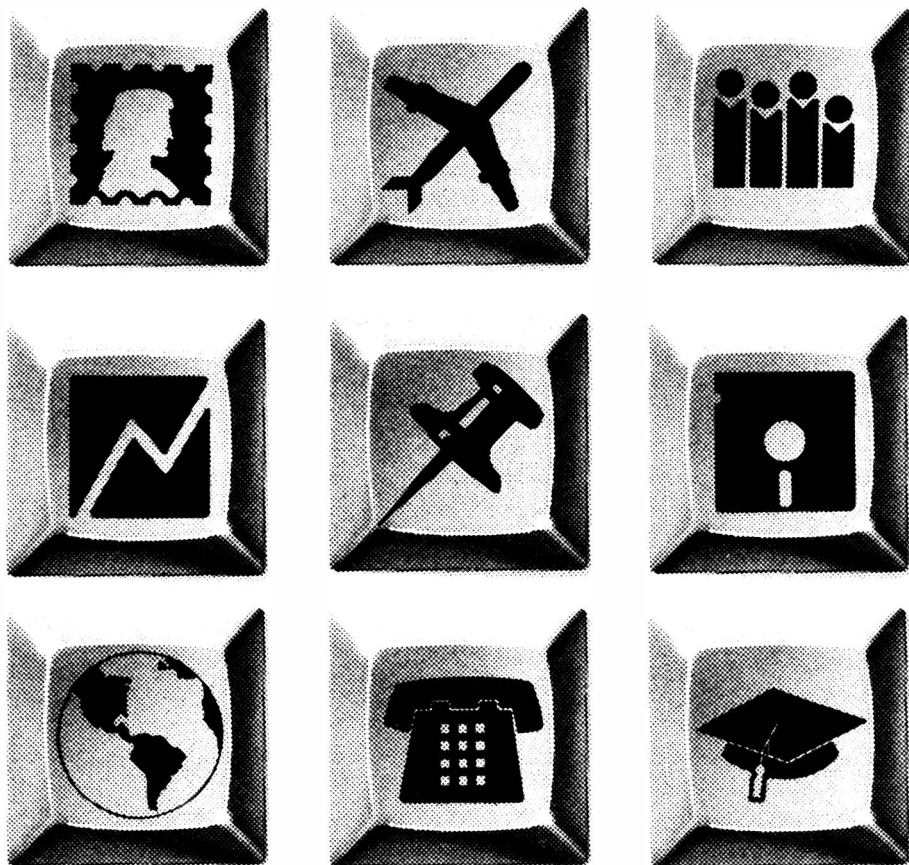
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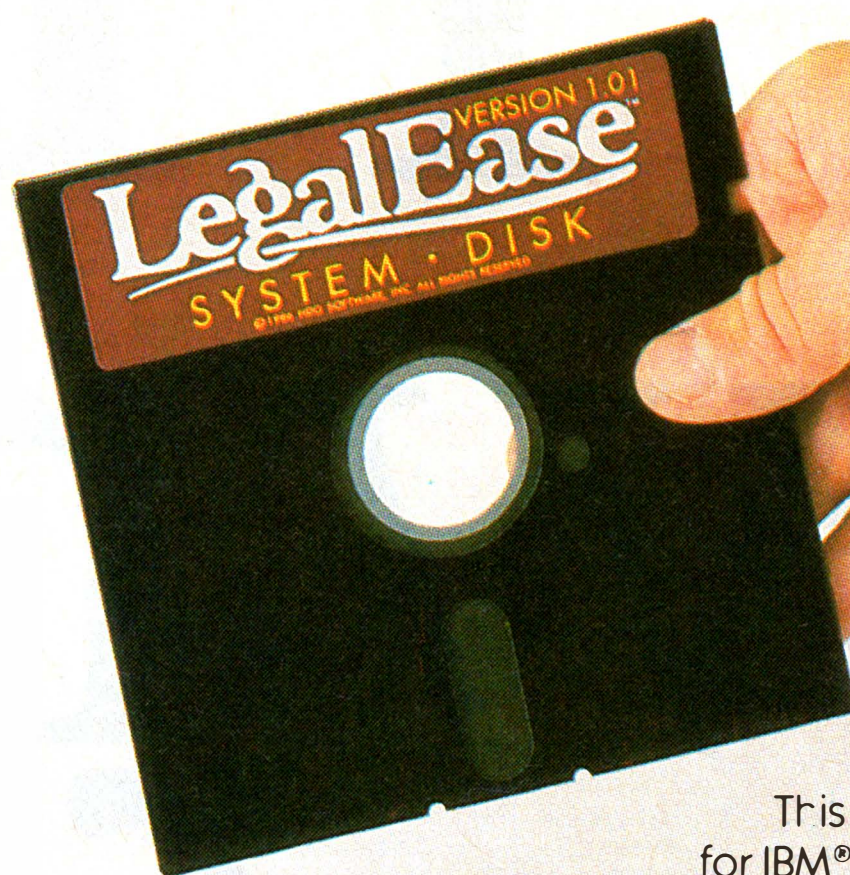
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By John Griffith

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LETTERS

INCOME TAX WINDOW

The Lotus 1-2-3 tax worksheet on pages 68-69 of your article, "Tax Strategies for the Age of Reform" (PERFORMANCE, December) is really slick. I, for one, would like to see more such useful tools presented in future issues of *Personal Computing*.

While there were a few formulas missing (I6, some of row H, and the bottom line totals), they were easy enough to supply.

I am not sure, but I believe that the formula in B27 (+B25-B26) is erroneous when one must enter "0" on line 26, because the zero bracket amount on line 26 is greater than line 25. The B27 formula will, then, include the TOTAL ITEMIZED DEDUCTIONS (line 25) in the "Total deductions & exemptions" (line 29). This, of course, results in a lower tax, I think, than is appropriate.

If I am correct, then by removing the formula in B27 and using the following formula in B29 one could handle all the situations for line 26: @IF (B26>0, B25-B26+B28, B28). I would greatly appreciate knowing whether this is correct or not. If not, what needs to be done to handle the "0" when entered on line 26?

Again, thank you for a really useful tax tool.

William Keith Clark, Jr.
Carson City, NV

Editor: The formula in cell B27 is the zero bracket amount, which is the maximum income on which no tax is paid. For a married couple filing jointly for tax year 1986, the zero bracket amount is \$3,670. For cell B26 to be 0, the total of all deductions would be less than \$3,670. If that's the case, the taxpayers should use a short form rather than itemizing. However, we should have subtracted the zero bracket amount from taxable income rather than from deductions, which would result in a higher tax.

In general, our attempt to automate tax calculation created confusion for some readers. Instructions accompanying the Lotus 1-2-3 worksheet said: "Refer to the appropriate line in the worksheet's tax tables [in columns G-H-I for single filers or K-L-M for married filers] and enter the amount computed for your adjusted gross income." Some readers interpreted that to mean that the numbers in columns I and M, which are headed "Your Tax Is," were correct on every line for every income bracket. In fact, the correct tax appears only on the

line appropriate to the taxable income in cell B30. Because all of the formulas reference cell B30, tax calculations for all but the entered income are incorrect.

Our example was the tax return of a married couple with \$24,320 in taxable income in cell B30. In cell M10, the worksheet properly calculates their tax at \$3,249 before credits. The other numbers in column M cannot be used for comparison purposes. A couple with a taxable income of \$70,000, therefore, wouldn't be owed \$612, which is the figure in cell M10 of our example. If \$70,000 were shown in cell B30, the correct tax for that income, \$18,574, would appear in cell M15, which is the line appropriate to the bracket between \$64,750 and \$92,371.

We were overaggressive in using a \$500 political contribution tax credit in the sample worksheet. The maximum tax credit for political contributions is \$100 on a joint return.

Your article on "Tax Strategies" was very enjoyable. I was especially interested in the 1-2-3 spreadsheet for tax calculations. It gave me, as a novice 1-2-3 user, an opportunity to learn more about how 1-2-3 works, and it looked like something that could be used to help with tax planning for myself and acquaintances.

However, I was somewhat disappointed in the article and basic spreadsheet. The formulas should be listed so that a person can key in one and then use the COPY feature to put in the rest that are similar. I had to search through the formulas to determine which were similar, and that slowed the process down considerably. Some of the formulas were left out of the article (column H for 87 and 88) and a few improvements to the basic spreadsheet are necessary, in my opinion. The model assumes a 7.5 percent inflation rate, three (3) dependents, and does not calculate the final tax in line 37. I made changes to those deficiencies in my own spreadsheet. Cells B2, C2, and D2 are where you enter your number of dependents and B29, C29, and D29 calculates the exemptions based on your actual number of dependents. Cell E2 is where I put an assumed inflation rate. Use decimal value of rate (10 percent = 0.1, etc.). The formulas that used the 1.075 multiplier were changed to use (1+E2) as a multiplier. You could refine it further by using another factor for inflation in 1988, but guessing next year's rate is tough enough. Cells B37 to D37

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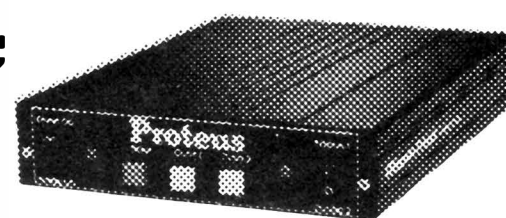
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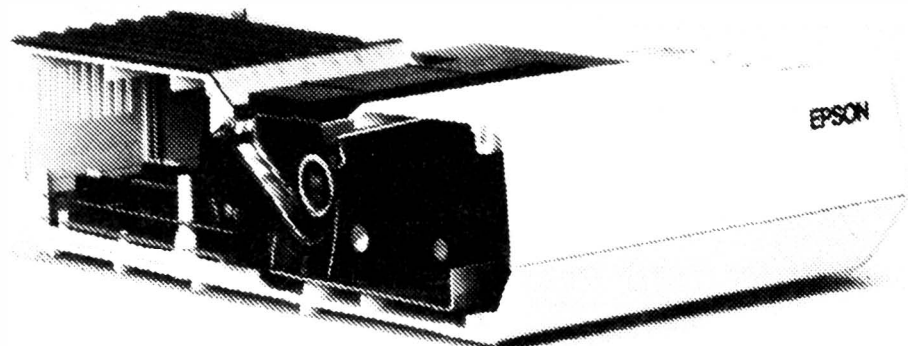
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LETTERS

were fixed by adding the formula (+ B33 - B36) and so forth.

I believe that 1-2-3 should be able to look at the tax table calculations (column I and M) and pick out the proper tax for line 33. It would need to be told if it was a single or joint return (another information block) and then do the comparison that we must go through now when working the spreadsheet. By adding that operation to the model, it would make the entire operation automatic with the exception of initial data entry. I would like to know how 1-2-3 can be made to do this operation.

Ken Erikson
Norwich, CT

Editor: The worksheet indeed is very basic. Your suggested methods for accounting for inflation and personal exemptions are good additions. Getting 1-2-3 to automatically put the proper tax into line 33 is quite a bit more complicated. One way would be to create look-up tables in a scratch area of the worksheet. You're right that we did inadvertently leave out some formulas, including the three totals on line 37, Your Tax. They should be:

B37: +B33-B36
C37: +C33-C36
D37: +D33-D36.

As for column H (Taxable Income Less Than) in 1987 and 1988, some readers may prefer to enter the numbers rather than formulas. For those who prefer formulas, they are:

H24: +G25+1
H25: +G26+1
H26: +G27+1

H33: +G34+1
H34: +G35+1
H35: +G36+1

VP-EXPERT

The "AI Update" article (PRODUCTIVITY, December) is, generally, excellent. However, on page 105 a small excerpt from an interview that I gave might lead your readers to a very inaccurate understanding of Paperback Software's VP-Expert program. Your quote from me states: "VP-Expert was shown to us as an M.I. clone. We made it a more sophisticated program by adding features like action blocks that tell the program what to do at the end of a rule, but are independent of the rules. This makes it flexible."

While this is an accurate quote, it is only a small part of what I said and it needs clarification. I additionally stated

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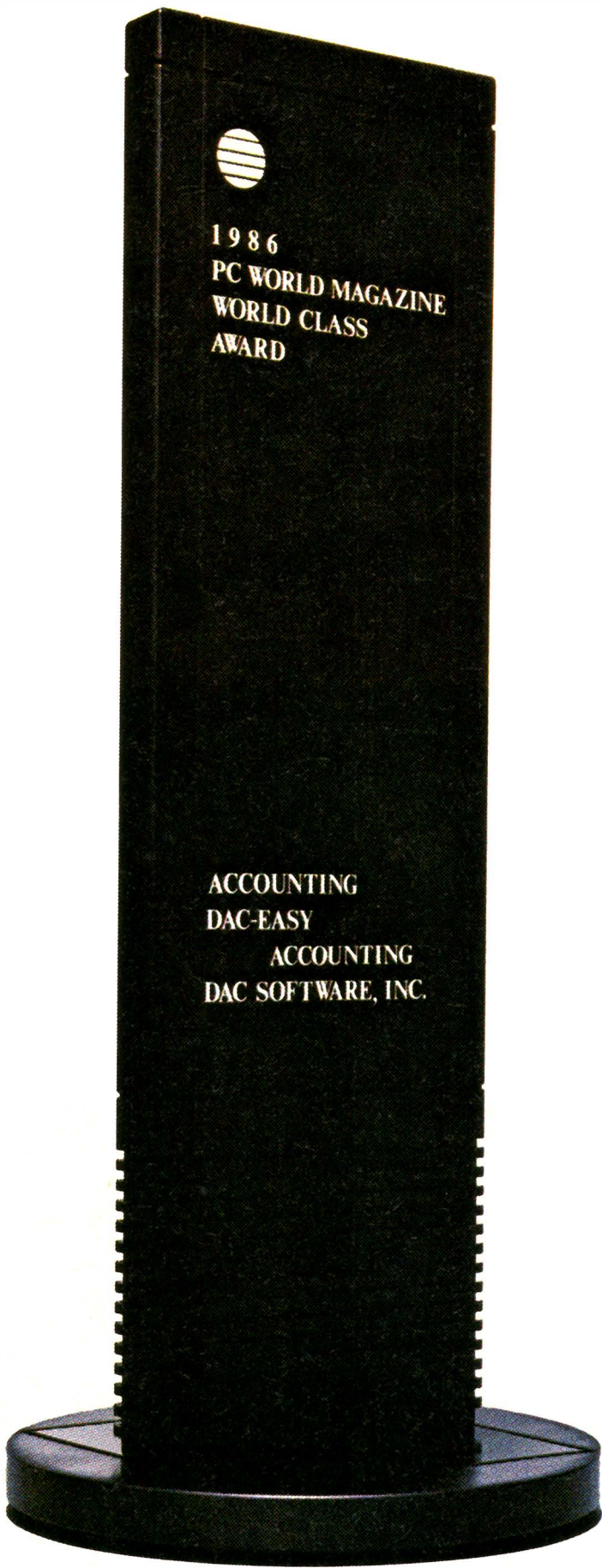
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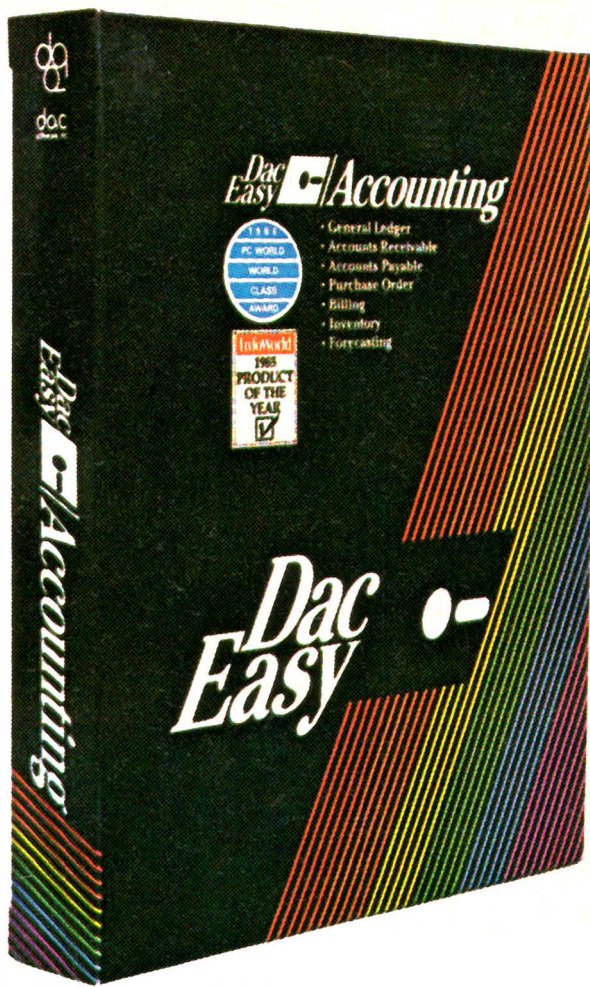
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LETTERS

that VP-Expert has evolved to the point where the product can no longer be considered an M.1 [an expert system development tool from Teknowledge, Inc.] clone. Our position at Paperback Software is that we support market-defined industry standards only to the extent that the standard is worth supporting. We always add a great deal of value to

those standards in the form of new features and capabilities.

For example, VP-Planner includes a spreadsheet that is compatible with Lotus 1-2-3, since the Lotus derivation of the original VisiCalc spreadsheet is both an accepted and a good industry standard worth supporting. Nevertheless, VP-Planner adds a great deal to

that standard in the form of its data base capabilities. It is not simply a 1-2-3 clone, as it has frequently been misrepresented to be. In the case of VP-Info, our relational data base program, we chose to adopt the dBase data base file format as a worthwhile industry standard. However, VP-Info's programming language differs significantly and represents a vast improvement over dBase III.

In the case of VP-Expert, we have completely changed the program from its original appearance for two major reasons. First, too few copies of M.1 have been sold for it to represent any form of an industry standard; and second, upon close analysis we have found M.1 itself to be woefully inadequate in meeting the needs of the general personal computer user. The published quote implies VP-Expert is an M.1 clone with some improvements. In fact, VP-Expert is a radically different program with some historical similarities.

Adam Osborne
CEO, Paperback Software
Berkeley, CA

MORE USEFUL, LESS FLASHY

After reading "Speed! Speed! Speed!" (PRODUCTIVITY, January), all I could think was that there surely must be things that are more important to the vast majority of computer users than ever-bigger RAMs and ever-faster processing rates. While there are probably a number of people who eagerly welcome the advent of the 386 systems, my advice to computer engineers and designers is to concentrate on more useful, if less flashy, advances. Here are three ideas for starts: hard and floppy disk drives that don't crash and damage the files; built-in simultaneous backup systems; and simple "compatibility converters" so that we can break free from the PC/MS-DOS stranglehold and make full use of other, excellent systems.

Steven Tiger
Monroe, NY

A CONSUMER CHOICE

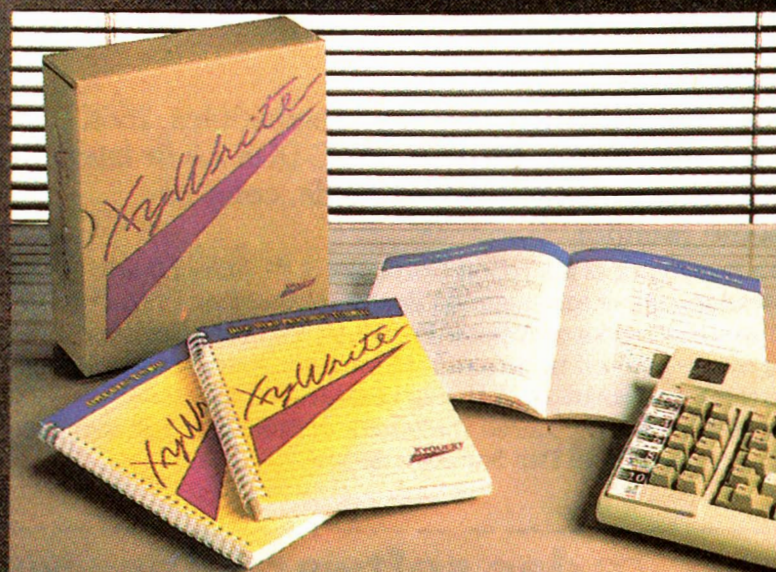
As a recent purchaser of a personal computer and new subscriber to your magazine, I enjoyed reading my first copy. I was a little disappointed, however, with the article "Hard Choices For Consumers" (TIPS, December). Why was there no mention of Tandy computers?

When I decided to purchase a com-

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Peter O'Connell
Peter O'Connell
National Sales Dir

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Mr. Anthony Bennett
Professional Interiors
3205 Washington St.
Newton, MA 02135

Dear Mr. Bennett:

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If one of your goals is low energy costs, you will be particularly interested in several designs that utilize both passive and active solar design. These houses incorporate an attached solarium, which not only serves as a solar furnace, but is also a light-filled space for eating or just being close to nature. These recent designs have proven to be extremely popular in your area.

Another series of designs range from 1400 to 2400 square feet. These plans were especially conceived to suit smaller families who require fewer rooms, yet don't want to cramp their living style. If you are just beginning a family or have children who are grown, you will appreciate the spacious interior; the low maintenance, and projected energy costs.

Siting was another consideration for our architects. Almost every design in this series is adaptable to a wide variety of building sites, from flat to sloping. In fact, land that rises steeply, and is usually considered difficult, opens up many interesting possibilities for most of the designs. For example, low cost extra space can be built under part of the house. This space can even be utilized as a separate apartment for in-laws or an office.

Again, thank you for your interest. If I can answer any questions or provide further information, please don't hesitate to call me personally. We look forward to serving your housing needs.

Very Truly Yours,

Peter O'Connell
Peter O'Connell
National Sales Director

20TH
CENTURY
HOMES

November 14, 1986

Mr. James Keefe
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Again, thank you for your interest. If I can answer any questions or provide further information, please don't hesitate to call me personally. We look forward to serving your housing needs.

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(For More Information Circle 54)

LETTERS

puter, I read every review and article I could find before selecting the Tandy 1000 SX. My decision was based on its IBM compatibility, documentation, service, price, place in the market, and reputation. I was impressed with the fact that Tandy IBM compatibles are produced in the United States and that Tandy is number one in the sale of PC compatible computers.

There is growing concern about the U.S. trade deficit, and I think Tandy is to be commended for offering such a fine American-made computer at competitive prices.

Dennis Gunderson
Rapid City, SD

Editor: You're right. Tandy is now a significant factor in the personal computing market. They should have been included in the article.

SIMULATIONS SPELL RELIEF

Robin Nelson's article, "Into The Wild Blue Yonder" (ESSAY, November) was terrific. Speaking as one whose personality definitely has been toggled into another mode (not necessarily hyperanal, however) by some of the more abstruse applications, I feel programs like Flight Simulator, Gato, or Strike Eagle should be bundled with every computer.

The day is not far off when Ashton-Tate or Lotus will be sued by an unhappy spouse whose mate disappeared into a spreadsheet and was never heard from again; bundling of a really decent simulation with each system might be as important as knowing where your Pepto-Bismol is after ingesting a Szechuan banquet.

I hope Robin Nelson will essay forth in *Personal Computing's* pages again. (Sorry, I couldn't help that. Perhaps I am in hyperanal mode, after all....)

Marcia Blake
Paradise, CA

WORDPERFECT LIBRARY

A review of WordPerfect Library in your November issue must not go without a response. You state that the product is intended for use with Word Perfect Corporation products only.

Not so! For example, at one office in our community, WordPerfect Library is used as a DOS shell program to provide easy entrance and exit to Lotus 1-2-3, WordPerfect 4.1, dBase III Plus, Aspen/2, Harvard Total Project Manager, a tele-

communications package, and several utilities, in addition to the clock, calendar, calculator, and such included with the program. There have been no problems and I consider the WordPerfect Library to be a wonderful disk management and menu system for any hard disk user. And, as icing on the cake, the package includes a Macro and Program Editor. The program is a very useful piece of software.

Marilu Waybourn
Flora Vista, NM

A LOOK BEFORE YOU BUY

Your article, "Three Alternatives for Managing Your Portfolio" (PERFORMANCE, November) was timely and well written.

I realize the story did not really make a comparison of different software packages, but I would like to make one clarification. Under your "Dedicated Software" section, you state that "With the average portfolio management software package priced in the \$200 to \$300 range, you are required to spend a considerable sum in advance for a software package that you have not even seen demonstrated, and once you open the software package, it can not be returned for a refund."

While this is true of most packages, Market Maker Investment Software offers a \$15 demonstration package that contains complete documentation and a 95 percent complete demo (it limits incremental values, but is otherwise complete) of its AVA (Asset Valuation and Analysis) investment portfolio package. Additionally, the demo price is credited to the purchase of the actual Market Maker Investment package, which has a suggested retail of \$195.

Serge Timacheff
San Francisco, CA

Editor: Serge Timacheff is a partner in the public relations firm that represents Market Maker Investment Software.

NOT SO SMART

The "AI Update" article (PRODUCTIVITY, December) did little to address the state of "legitimate" artificial intelligence. You neglected to reference the gentleman who is considered one of the fathers of AI, Carnegie-Mellon Professor of Psychology and Computer Science and Nobel Prize-winner Herbert Simon. An interview with Dr. Simon and his colleagues, rather than just with

Boost cursor speed. Stop cursor run-on.

With all the recent hoopla over performance, it's ironic that two of the PC's ergonomic deficiencies have been overlooked — its slow cursor, and the tendency of the cursor to remain in motion (run-on) after a cursor key has been released. Finally, the solution — Cruise Control™ from Revolution Software.

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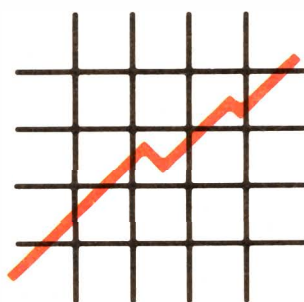
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(For More Information Circle 181)

LETTERS

a number of software entrepreneurs, would have shed a much clearer light on the health and prognosis of AI.

In an effort to quickly capitalize on the romance and intrigue of AI, software developers such as those you interviewed are pedaling little more than "smart data bases," what the market refers to as expert systems. The goal of AI is much more than that, however.

According to Dr. Simon, who with Allen Newell developed the first AI computer program, called Logic Theorist, in 1955, the goal of research is not just to get computers to think smart, but to get them to do smart things by simulating the processes the mind uses in problem solving. Simon's AI research, which encompasses the fields of cognitive psychology, linguistics, computer science, and neuroscience, involves learning—getting computers to assimilate and accommodate for experiences and to apply this "knowledge" to novel situations, much the same way we do.

It's time to call a spade a spade. Let's limit the use of the AI label to the "real thing."

Richard Courcelle
Rutland, VT

COMPUTERS AND LEARNING

The article, "The Impact on Today's Children" (EDUCATION, October) was generally well written and informative. I agree, particularly, with the concern that the use of personal computers in schools—at the lower grade levels, at least—could lead to personal computers being used by teachers in much the same way that some parents have used TV—that is, to abrogate much of their own responsibilities for teaching the 3 Rs and other traditional subjects.

Should personal computers merely be teaching/learning tools for other subjects, or can a young child, say under the age of 10, be taught to use a personal computer for its own sake—for example, use of the everyday DOS commands, or some of the easier, more user-friendly software? I see no reason why not, and I'm sure some of them already have.

Penny C. Weiss
New York, NY

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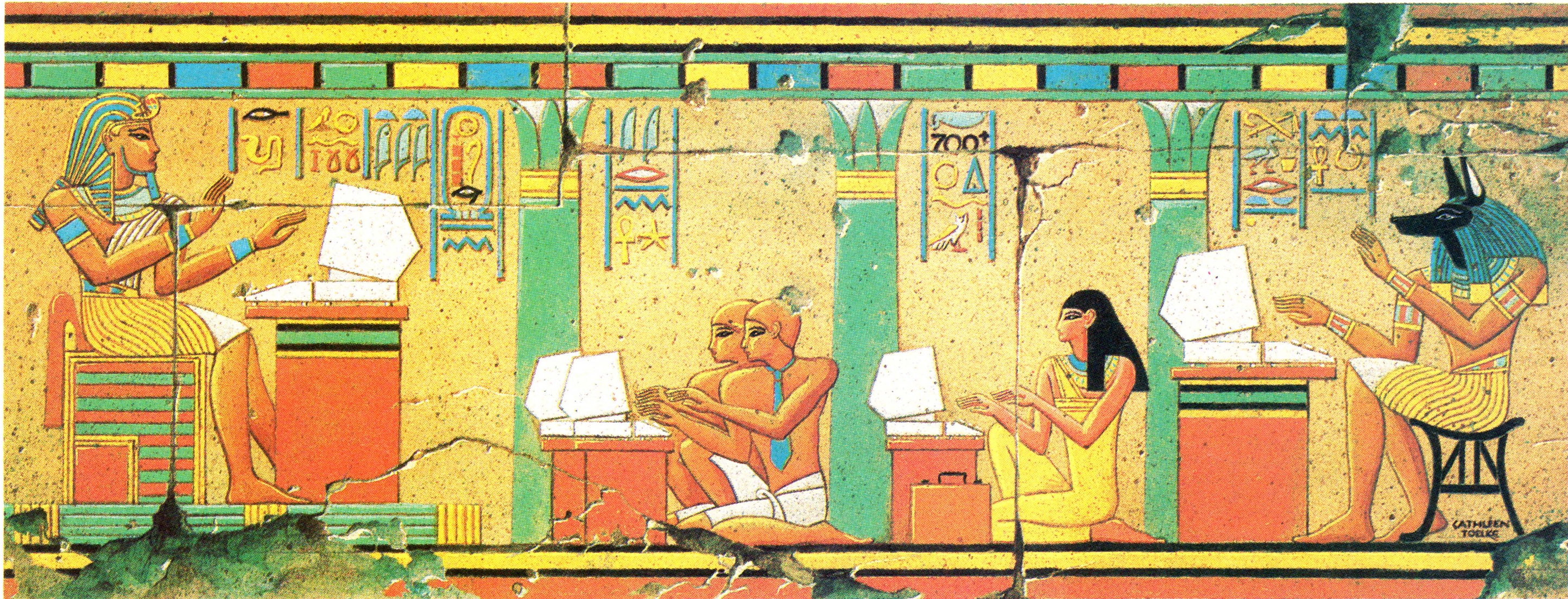
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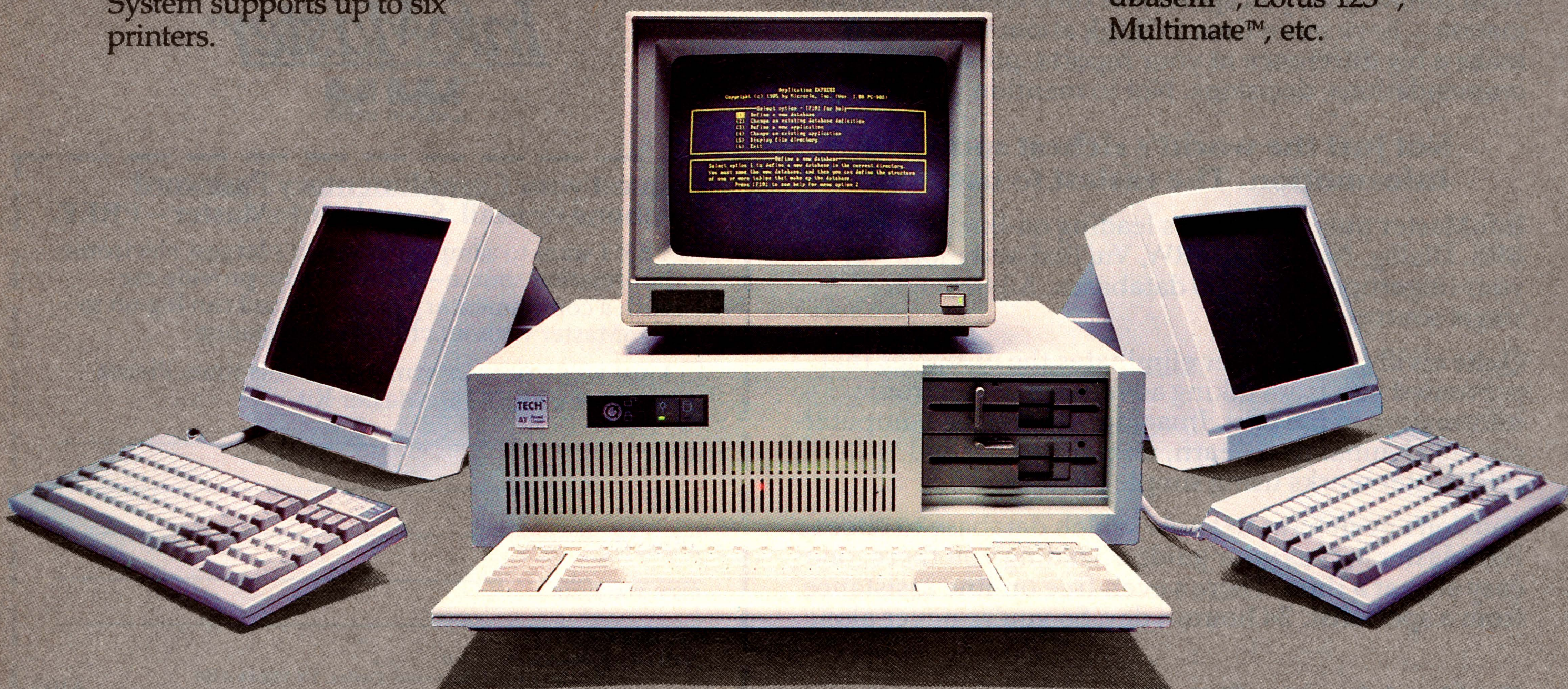
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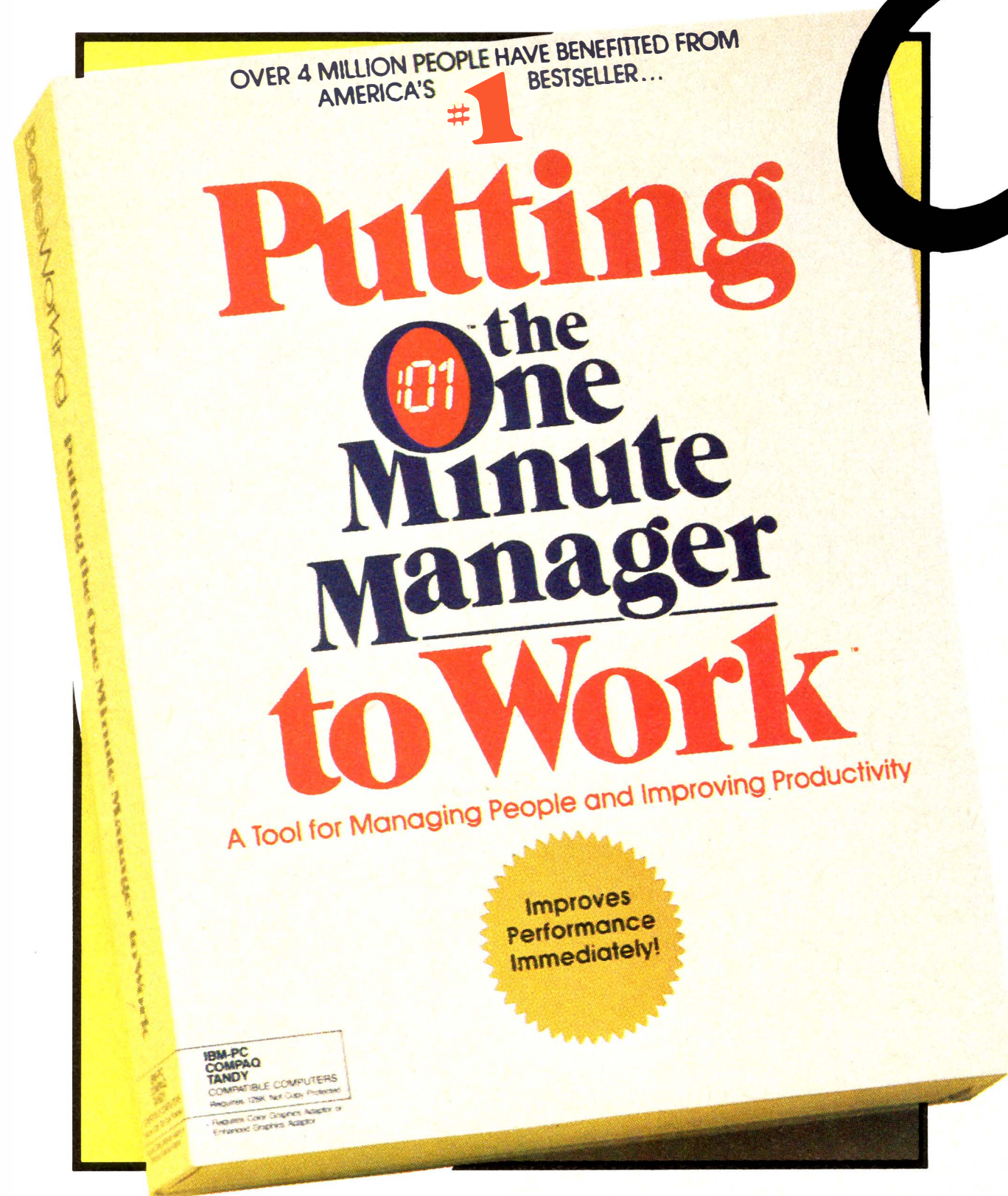
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Successful Teams.



Can A Computer Program REALLY Increase Your Productivity By More Than 30 Percent?

Introducing PUTTING THE ONE MINUTE MANAGER TO WORK. An important new software tool that actually improves the productivity of you and your employees — within the first hour that you use it.

Jan 15 88 12:48 AM INVOLVE CHANGE

PINPOINT Company Driving Accidents Date: 01/15/88

TEAM MEMBER Ron Anders

GOAL Train 425 of our 426 drivers

MEASUREMENT CRITERION

PERFORMANCE LEVELS Outstanding 425 Acceptable 400
Minimal 375

INCENTIVES Selection of manager of the year

TRACKING RESPONSIBILITY Ron Anders TRACKING FREQUENCY

THIS GOAL'S PRIORITY FIRST REVIEW DATE (7-10 days away)

01/25/88 (1-5, 1 is highest)

CONDITIONS Drivers allowed to attend class during work hours

ACTION STEP 1 Create video tape
2 Schedule classes
3 Sign up drivers
4 Give diploma to drivers
5 Post graphs of safety record

F1	F2	F3	F5	F9	F10
SAVE	CLEAR ENTRY	RESTORE ENTRY	PRINT SCREEN	DON'T SAVE	HELP

Involve your employees in creating action plans.

"It's straightforward, concise and it works!"

*William A. Andres
Chairman
Dayton/Hudson Corporation*

This computer program was designed by Ken Blanchard and Robert Lorber, co-authors of the One Minute Manager books that have been read by over four million business men and women. PUTTING THE ONE MINUTE MANAGER TO WORK is based on the P-R-I-C-E system for identifying and reaching management objectives. First you PINPOINT an area for improvement, then RECORD the past and present performance measurements. You then INVOLVE your employees in designing action plans, and you systematically COACH them on their efforts. Finally, you EVALUATE your team's progress toward the desired objective.

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Putting the One Minute Manager To Work works with DOS 2.1 or higher, and is designed for the IBM PC, Tandy 1000, Compaq or other compatibles. Requires Color Graphics Adaptor or Enhanced Graphics Adaptor.

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The jury is in...the verdict is **MINDREADER**

MindReader is a smash hit with the PC reviewers, and the favorite of thousands of users. Why? Because it's the first software product to use Artificial Intelligence to make real world business writing a breeze!

MindReader is an absolutely unique writing product especially designed for the business user. It gives hunt-and-peck typists exactly what they need to do real world correspondence, leaving WordStar and MultiMate for the fast production typists.

MindReader combines top performance, certified by the PC industry's most respected reviewers, with an astoundingly low price of **\$65.00**.



THE NEW GENERATION

MindReader's amazing abilities come from the fascinating new world of Artificial Intelligence. With it, you don't have to be a skilled typist in order to write. **Just type the first few letters of a word, and MindReader finishes it for you.** Plus you can expand its comprehensive dictionary with your own business words and phrases.

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WRITING FOR THE REAL WORLD

MindReader gives you what you use most in business writing—mail merge, labels, envelope printing and powerful but easy-to-use editing functions.

Real business writing isn't a 30-page document with footnotes. More likely, it's a 1½ to 5-page letter with name and address, original text, paragraphs of boilerplate, a few phrases and a close. With MindReader, a real business letter can be created in minutes!

**“EDITOR'S
CHOICE”
PC Magazine**

**“The sort of technological
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expect in this business.”**

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Paper.”**

PC Week, March 4, 1986

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Nobody's Perfect...

Game	Winner	Time to Move
1	SARGON III	5 seconds
2	SARGON III	5 seconds
3	SARGON III	15 seconds
4	SARGON III	15 seconds
5	SARGON III	30 seconds
6	Chessmaster	30 seconds
7	SARGON III	3 min
8	SARGON III	3 min

YOU CAN'T WIN THEM ALL.

We pitted Sargon III, the world champion, against the challenger. Head to head, with no punches pulled. And believe it or not, the champ lost one game to the challenger. But Sargon III beats Chessmaster 2000 almost everytime.

Sargon III is the result of more than twenty one man years of development. Sargon III will play at precisely the level of difficulty you desire. Ask Sargon III for a hint, take back a move you've already made, replay a sequence, change sides, or set up your own board for customized learning. Sargon III lets you study in detail more than 100 great games of history or review 45 classic chess problems,

all on screen. Sargon III also includes the largest library of opening moves available on any chess program.

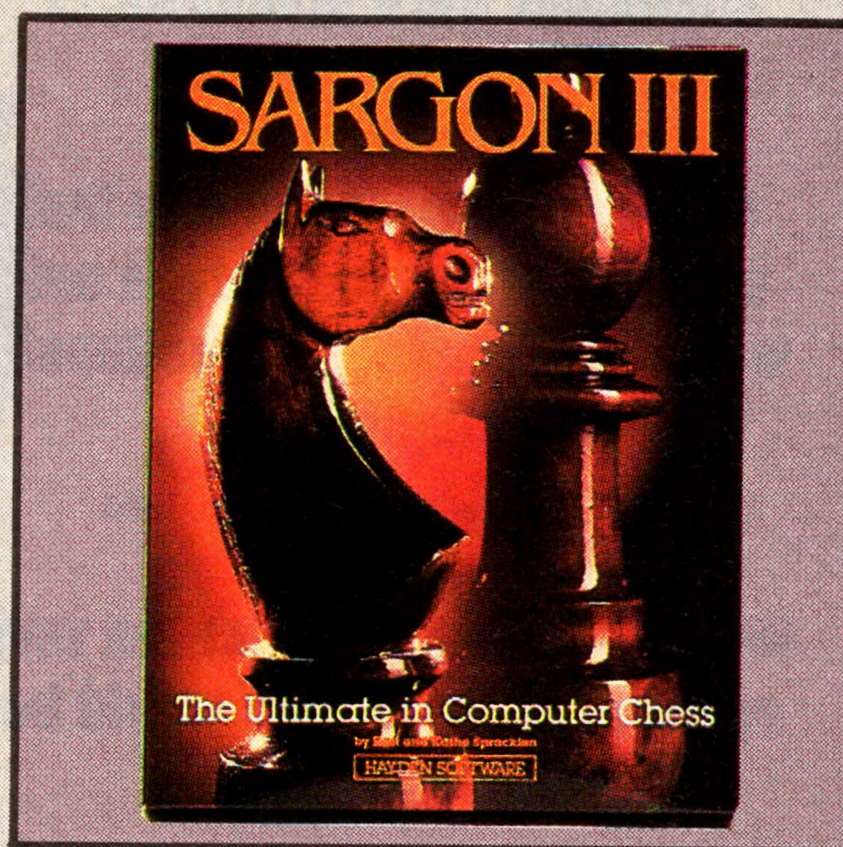
SARGON III WRITES CHESS HISTORY

In a tournament sanctioned by the U.S. Chess Federation, Sargon III beat

a master rated 2209. That makes Sargon III the only microcomputer program ever to defeat a player at that level.

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Written using 4th generation language	NO	YES
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Easy-to-change file structures	NO	YES
Report generator	NO	YES
Multi-user option available	NO	YES
On-line help messages	NO	YES
3-yrs. GL data by month	NO	YES
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**Feature for feature, dollar for dollar,
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- Statements
- Ageings

Accounts Payable

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- History of purchases

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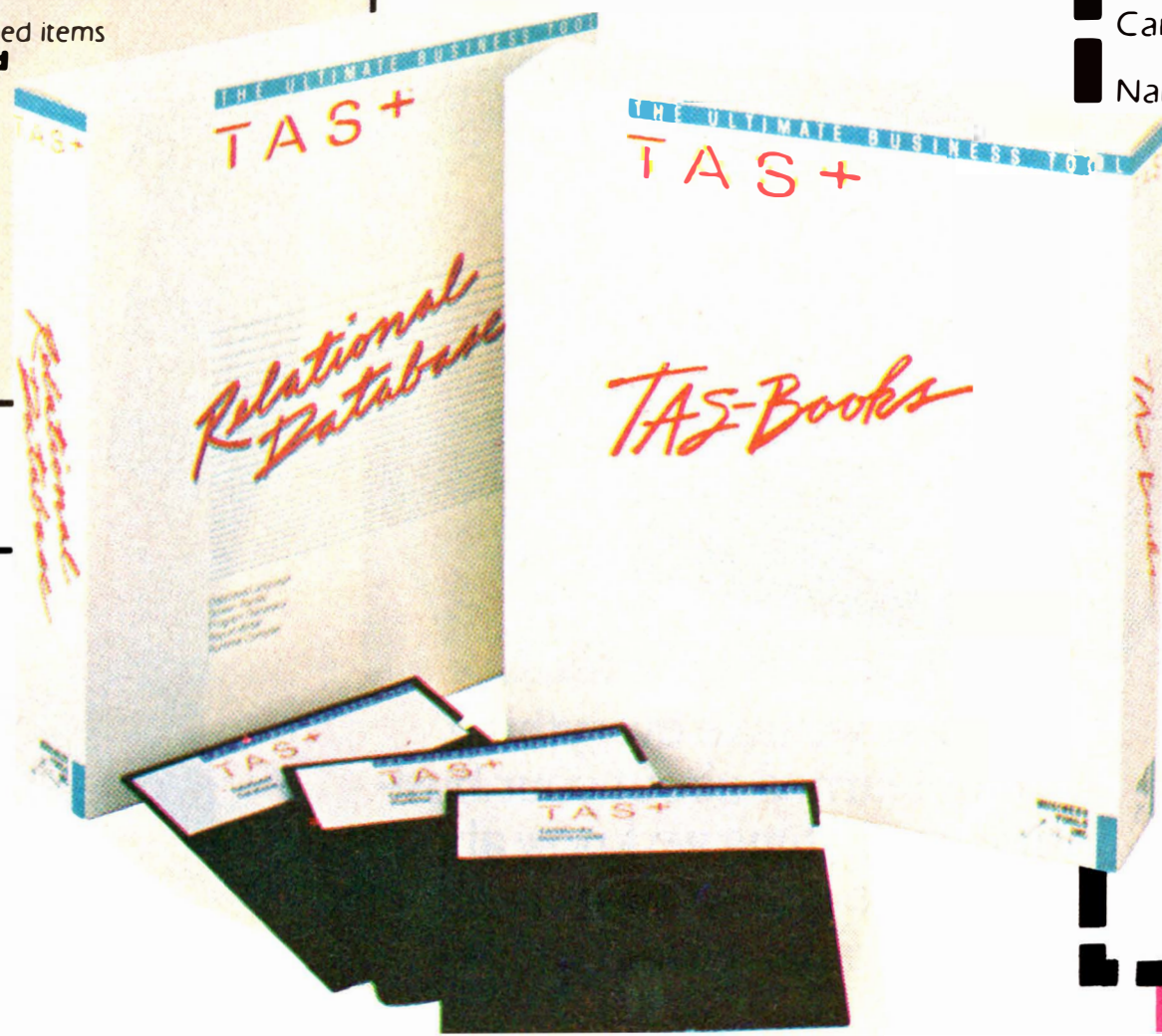
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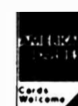


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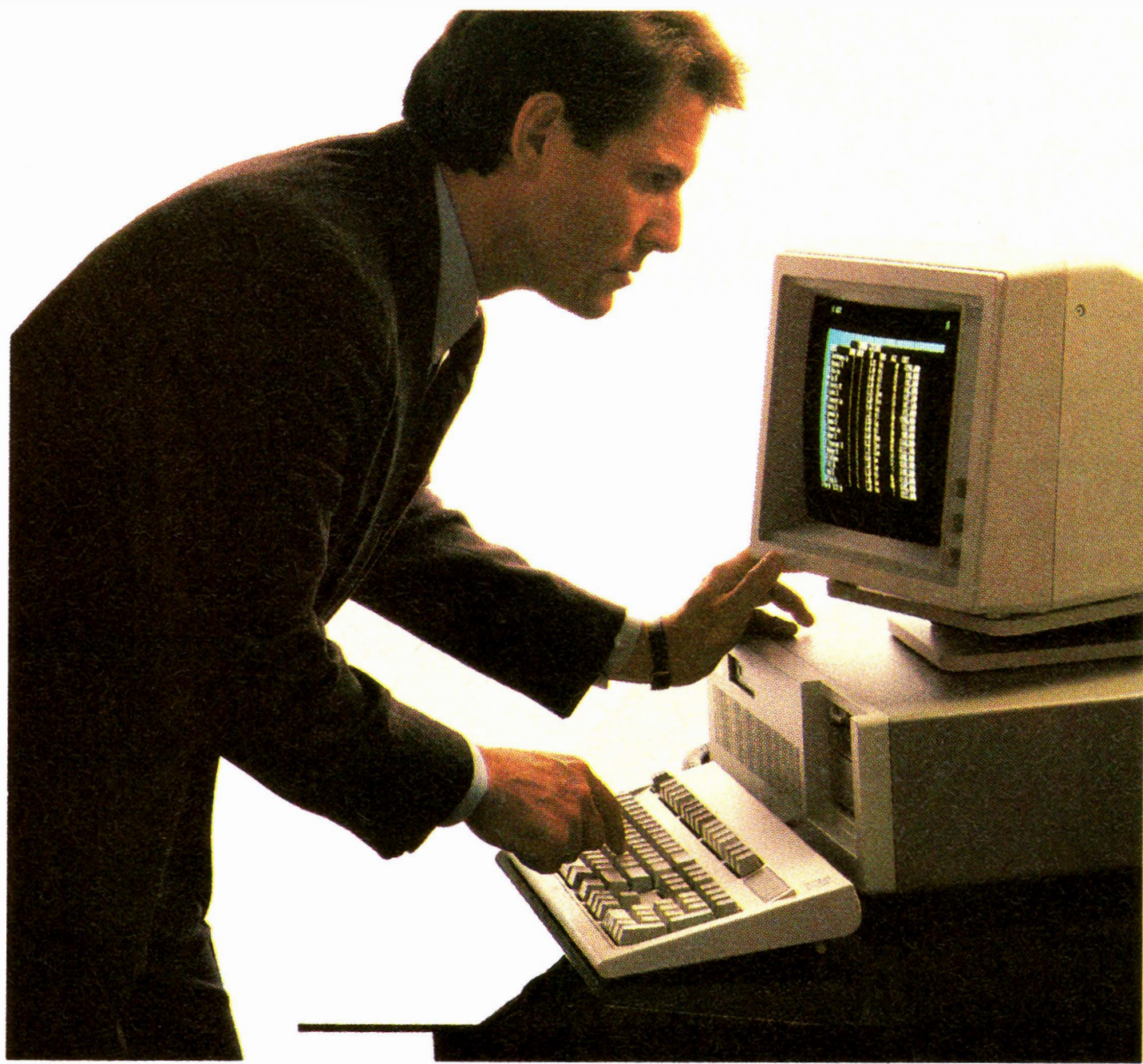
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(For More Information Circle 2)



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We take the time to understand your business. How else can we stand behind what we sell?

Computers are not a miracle cure. Buying computer equipment with a famous name (or even initials) doesn't guarantee your office will become a paragon of efficiency and productivity overnight.

To get a system of value to your company, you should buy it from someone who not only

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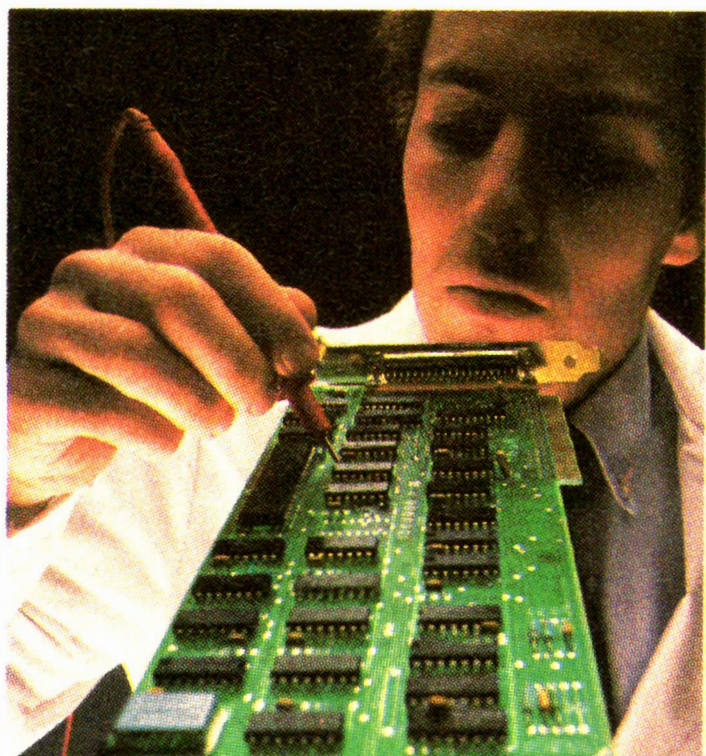
Before we sell you anything, we find out exactly what problems you expect your new system to solve. And what changes you see for the future.

We get to know the people who'll be using the new system. We listen to their anxieties, and give them information to make the transition from pencil to print-out easier.

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We put together systems that last by matching up computer components that pass strict compatibility testing.



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The owners and management of Entré Centers grew up with the industry, having trained and worked for years with computer manufacturers whose products are now office standards.

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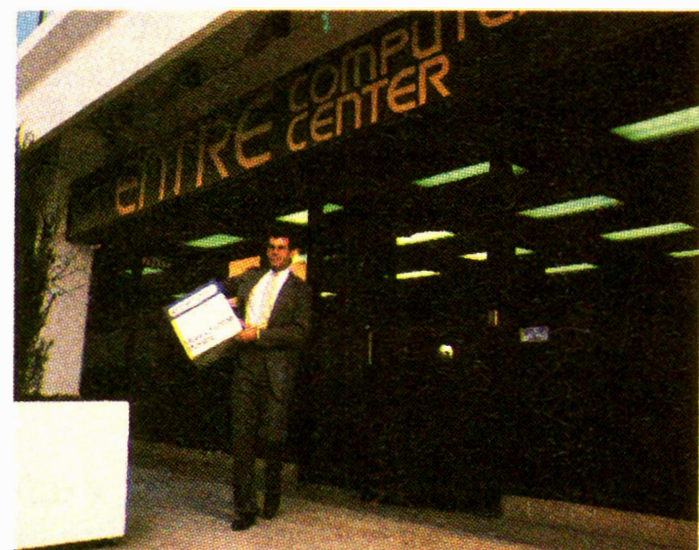
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Lotus Takes The Offensive

Targets 1-2-3 Clones; Add-In Market

■ Lotus 1-2-3 is probably the king of the MS-DOS office, and the Lotus Development Corp., Cambridge, Mass., has every intention of keeping it that way. Lotus has initiated legal action to protect its preeminent market position against encroachment from two software clones. The company has also moved to enter the spreadsheet add-in market. Finally, a lawsuit that claimed Lotus was liable for errors in a Symphony spreadsheet was dropped.

The imbroglio over the "look and feel" of software spilled into federal court in mid-January when Lotus filed copyright infringement suits against Paperback Software International (the publisher of VP-Planner) and Mosaic Software, Inc. (the maker of Twin). Both companies manufacture and market clones of the Lotus 1-2-3 spreadsheet program.

The suits, filed in U.S. District Court in Boston, seek \$10 million in punitive damages from each company. Lotus claims that the competing products "deliberately recreate the 'look and feel' of 1-2-3 in violation of copyright laws, and imitate the structure and sequence of the 1-2-3 interface." Lotus says that Paperback and Mosaic are engaging in plagiarism in their use of a macro language similar to 1-2-3's and further charges in the suit that claims in the companies' advertising that the products are functionally identical to 1-2-3 are misleading because the clones run slower than 1-2-3 and don't make as efficient use of memory.

Lotus chairman and president Jim Manzi says that Lotus has a responsibility to its customers, shareholders, and the industry "to take a leadership role in protecting intellectual property." The successful prosecution of clones, he adds, would help channel the energy of the computing industry "away from imitation and toward new breakthroughs."

Reached in London, Adam Osborne, president and CEO of Paperback Software, said, "I can't believe my ears. To sue 18 months after we came out with our product is ridiculous. It's because our sales are eating into theirs." Osborne claims more than 100,000 copies of VP-Planner have been sold. It is Paperback Software's best-selling product.

Manzi countered by saying that 1-2-3 sold more copies during the last quarter of 1986 than it has in any quarter since it was released four years ago.

"They [Lotus] themselves copied VisiCalc, and many people use their product on cloned IBM computers that copied the IBM BIOS," Osborne said. "We copied the spreadsheet portion of Lotus 1-2-3 and vastly enhanced the program as Lotus itself had with VisiCalc. The only difference is that we

sharply dropped the price." He says that VP-Planner's data base functions are superior to those available with 1-2-3. VP-Planner sells for \$99.95 and Twin retails for \$149.95, while 1-2-3 carries a suggested price of \$495.

In the software add-in arena, the day before independent developers were due to unveil 16 add-in products for 1-2-3, including four pop-up word processors, Lotus was privately showing its own desktop accessory program, Metro, which includes a clip-in word processor. (See "Buyers Guide To Spreadsheet Add-Ons," in this issue.)

Why would you also need the new 1-2-3 add-ins such as 4Word from Turner Hall or Inword from Funk Software? Conall Ryan, the product marketing manager who demonstrated the Lotus product in the company's New York offices, searched for the correct words. "You don't," he eventually said. The developers' other text processors are PlusWords (Amazon Systems) and Write-In (Blossom Software).

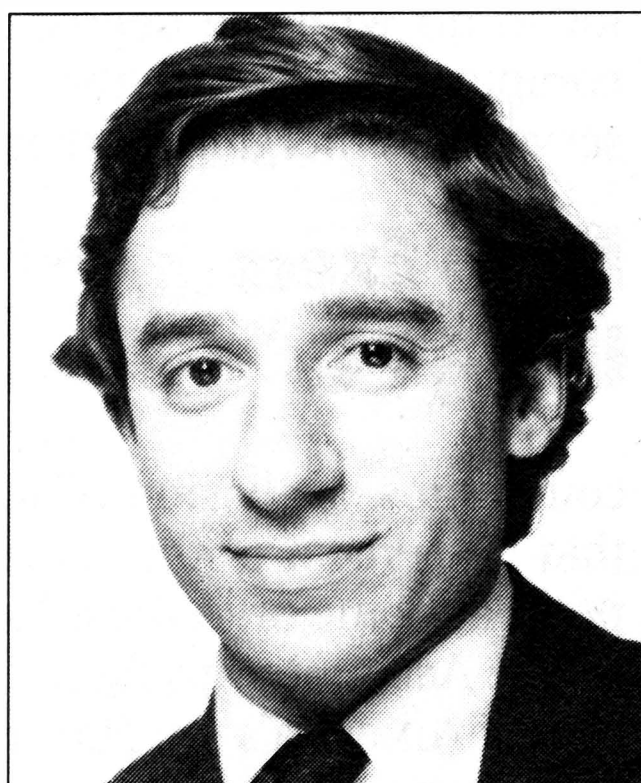
Paul Funk, president of Funk Software, the maker of Sideways, said, "I haven't seen Metro, and it sounds interesting, but I doubt it's as easy as having an add-in."

The add-ins are the first fruits of the 1-2-3 Developers' Tools made available by Lotus to independent developers last year. The products tie directly into 1-2-3's programming code and work only with 1-2-3. Metro, on the other hand, can be RAM resident with a variety of applications.

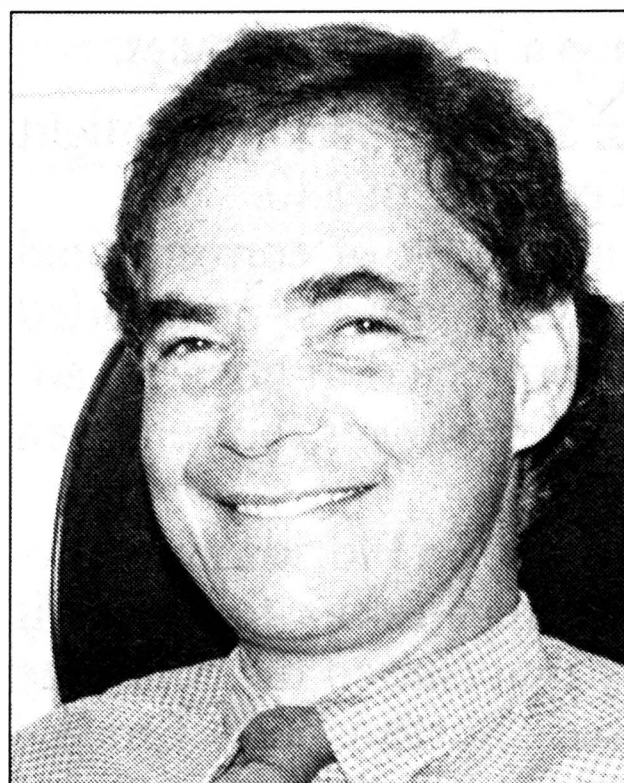
Metro is much more than a simple word processor. It includes the desktop accessory features found in products such as SideKick and the macro-generator capabilities of programs such as SuperKey. Metro replaces Spotlight, which Lotus had been selling since its acquisition of Software Arts.

Metro's Text Editor includes basic word processing capabilities using the familiar one-line 1-2-3-style commands at the top of the screen with brief descriptions on the next line. The Clipboard can cut and paste text into a particular column. The Clipboard also formats information for use in word processors and spreadsheets.

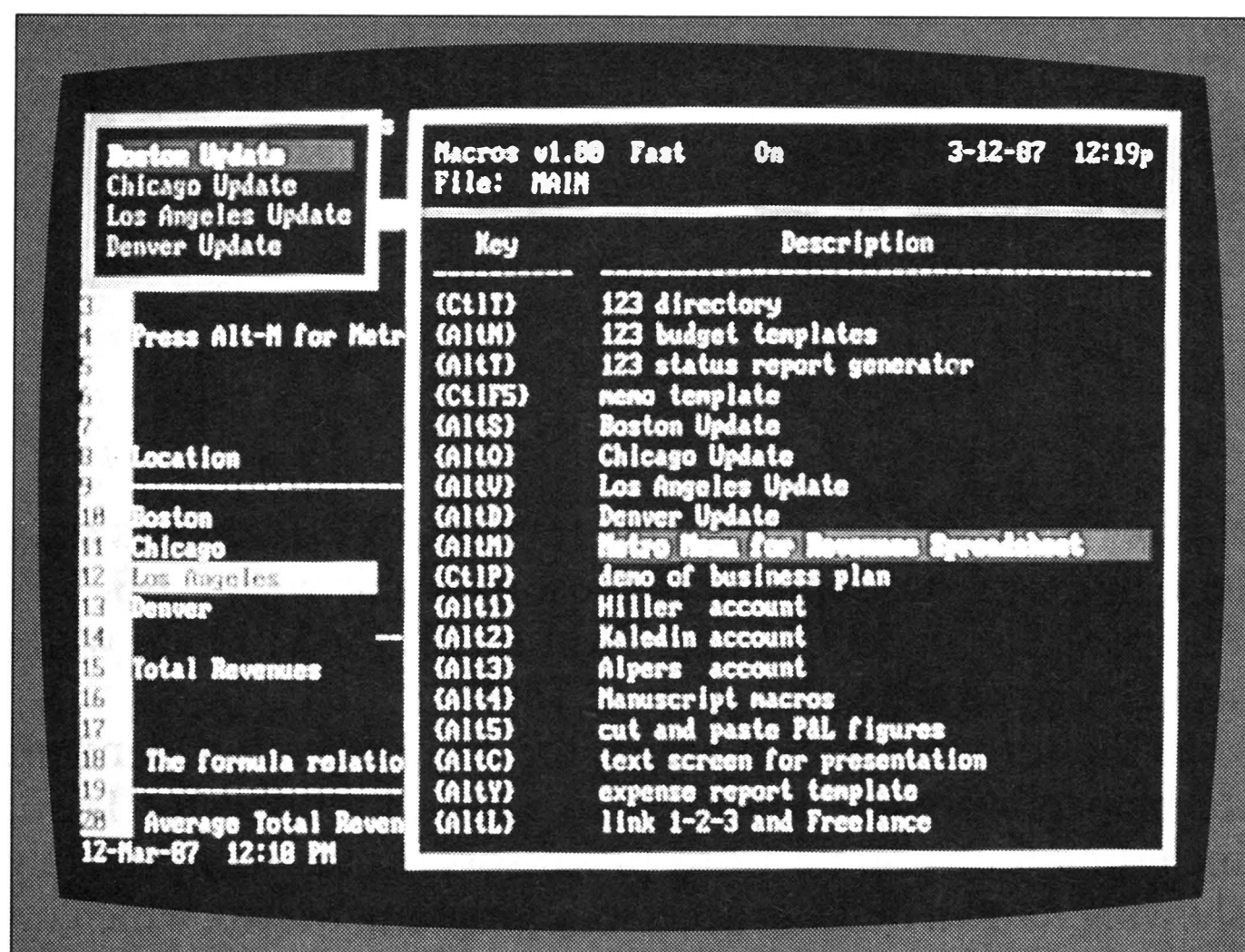
Metro offers a slew of other features, among them a DOS file manager, a list manager with outlining and sortable "to do" lists, and a Calculator with some popular @Functions such as Net Present Value built into the on-screen buttons. (The Calculator does not have an on-screen tape for reviewing previous calculations.) Also included are a Phone Book (with Hayes-compatible auto-dialer); a 112-line Notepad for attaching notes to a 1-2-3 cell or a Symphony word processing document; and a Watch, which tracks billable phone consultations and amount of time spent on up to 100 different projects.



JIM MANZI: "We must protect intellectual property."



ADAM OSBORNE: "To sue after 18 months is ridiculous."



Metro's Macro manager overlayed atop a 1-2-3 spreadsheet.

Metro is available from Lotus for \$85. Owners of Spotlight can exchange their disks at a reduced price of \$40.

Metro consumes between 80k and 120k of conventional memory (depending on how many of its features you decided to use) and the program is not copy protected. It does not address expanded memory, but it can, however, be removed from RAM with two keystrokes.

And finally, James A. Cummings, Inc., a Florida construction company, withdrew its suit against Lotus for what it claimed was a defect in Symphony that caused the company to make a \$254,000 error (also see "Spreadsheets Can Be Hazardous To Your Health," January 1987). "We maintained from the start that there was no basis for the suit," said Lindsey Kiang, Lotus' general counsel. "There was no settlement and no money changed hands." Kiang said that the spreadsheet error was caused by a Cummings user when he inserted a line for overhead costs at the top of a column of numbers that were to be added. The number fell outside the @SUM range, and the construction company entered a bid that was too low.

All Hands On Deck

■ Quarterdeck Office Systems, of Santa Monica, Calif., has begun shipment of a new version of its Desqview control program, which currently enables true multitasking on MS- and PC-DOS computers, plus built-in macros and cut-and-paste functions. Version 2.0 adds improved support of both graphics-based programs and some of the advanced capabilities of the new Intel 80386 microprocessor. In addition, version 2.0 includes an Application Program Interface (API) that enables software developers to write programs using Desqview's capabilities—developers can even bundle a run-time version of Desqview with such programs.

The upgrade strengthens Quarterdeck's contention that Desqview is currently the program that makes the best use of the potential of the 80386 chip. Version 1.3 (released this past October) was the first such product specifically designed for the 80386. Microsoft's ADOS (Advanced Disk Operating System), the successor to MS-DOS 3.1, won't be available until IBM releases it, and current indications are that this won't happen before autumn. Even when ADOS does appear, however, it's clear that the new operating system will be intended for use on 80286 rather than 80386 machines. In the meantime, Desqview provides multitasking now, although

companies such as Softguard and Phoenix Technologies are also readying 386 control programs. Microsoft, too, plans to begin shipping a 386 version of Windows before the end of the first quarter.

In its present form, Desqview has been holding its own, though certainly not winning the so-called "Windows Wars." Control programs such as GEM (Digital Research), Windows (Microsoft), TopView (IBM), and Desqview all claim the ability to run several programs concurrently, but none has established clear dominance. Although Desqview (like TopView) won't run graphics programs in a window, version 2.0 will be able to switch between graphics programs, though not run them concurrently. Desqview has found a niche as an aid to expanded memory boards. (It is bundled with AST's RAM-page product.) TopView and Windows, however, haven't yet defined a clear market segment, especially considering the size of the companies touting them. What happens next has a lot to do with the degree of market penetration by 80386 computers—and with the ability of the various contenders to serve that emerging market.

More Execs Using PCs

■ In a survey of the leading executives (vice-presidents and personnel directors) at 100 of the country's Fortune 1,000 corporations, Accountemps, a division of Robert Half International, reports that 39 percent of the people canvassed use a personal computer at home or in the office.

The Accountemps figure is in contrast to the nearly 22 percent of America's top 500 chief executive officers who reported they use a personal computer (either at home, in the office, or at both locations) in a survey conducted by *Personal Computing* for the special October 1986 issue entitled "Computing In America."

"It is surprising that executives, who know the value of computers, are failing to use them to boost their own productivity and in management planning and decision making," says Accountemps' vice-president, Marc Silbert. "It's partially a matter of perception, because I feel that an executive-caliber individual is never really more than two or three feet away from a PC."

"To tell you the truth, we were surprised that your [*Personal Computing's*] numbers were so low," Silbert says. "What I think we're seeing is the first wave of executives becoming acclimated to personal computers. When the second wave, the people currently in school, reach top management positions, they will bring along the familiarity with personal computers that they've gained on the school level."

Lifetree Fixes Bug

■ Lifetree Software has corrected the bug in its combination spreadsheet and word processing program, Words & Figures. The most prominent feature of the program is the ability to insert a spreadsheet into a word processing document. The bug in Words & Figures 1.0 appeared when the spreadsheet was inserted into the middle of text in a word processing document. An attempt to insert the spreadsheet into the middle of a sentence, or between two sentences, resulted in the program crashing. According to Lifetree's vice-president of marketing and sales, Wayne Wilson, it is unlikely that this situation would occur. Nonetheless, Lifetree has corrected the bug in release 1.01, which began shipping toward the end of 1986. The updated version also speeds up graphics capabilities.

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(For More Information Circle 80)

UPDATE

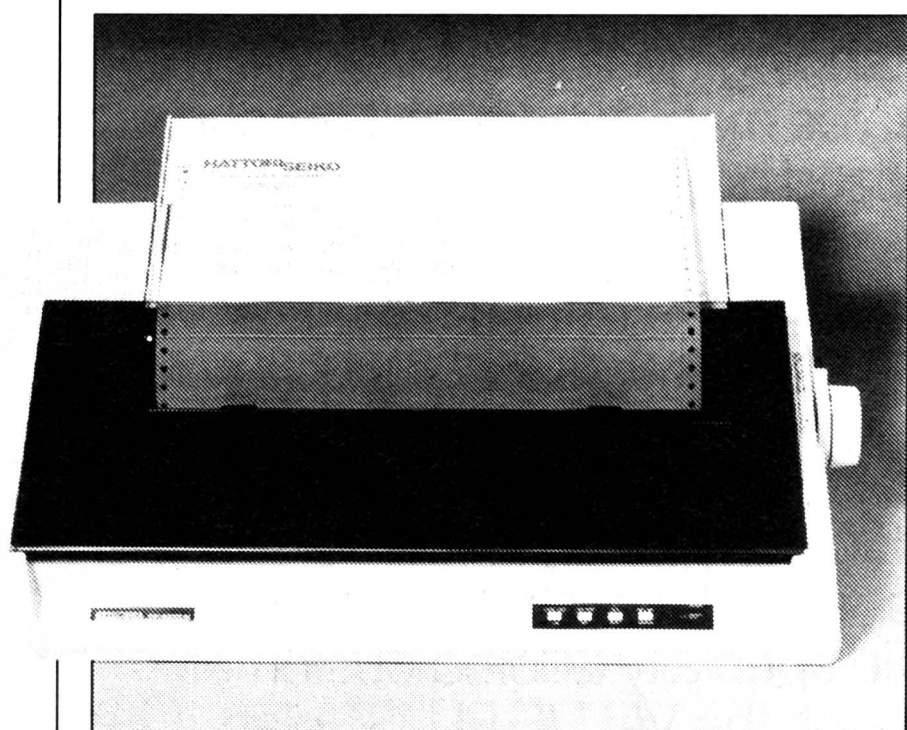
IBM On The Offensive

■ Buffeted by intense competition for sales that has drawn the attention of the computer-buying public, IBM sent a Christmastime message saying that the company has revamped its public relations department to facilitate reporters' access to press information sources at IBM's Armonk, N.Y., headquarters. As part of its renewed effort, IBM has split press assignments so that some representatives will handle personal computers while others will cover larger systems. Within these larger divisions, the company has assigned representatives to certain areas such as desktop publishing, printers, CAD/CAM (computer-aided design/manufacturing), and manufacturing systems.

According to Michael Starks, IBM's information systems representative, the move by Big Blue is a result of strong competition in the marketplace, most notably from clone makers and computer manufacturers of large systems, such as the Digital Equipment Corp. Starks noted that IBM, in recognizing that "it's a different world out there" now, was "taking the offensive" in press relations. Perhaps the strongest evidence of IBM's new commitment to easier press access was an extensive press packet of suitable IBM contacts and their "beat assignments," complemented by prepunched Rolodex cards listing company contacts.

Hardware Update...

■ Datavue Technical Systems of Norcross, Ga., has enhanced its Series 30 line of personal computer systems to include the Advanced System Self-Check Diagnostics, and the Enhanced I/O and Memory Expander option, a daughterboard for the 8612 CPU (\$239) ...**Panasonic Industrial Company's Computer Products Division**, Secaucus, N.J., has upgraded its Business Partner series with a computer-to-FAX communications board and hard disk capability. An add-on card available from the company (\$1,000) enables the reception of any documents sent by a Group 3 facsimile machine, either domestically or internationally. In addition, the company has reduced the price of the Business Partner 286 model FX-800 from \$2,995 to \$2,249; model FX-800FI from \$2,795 to \$2,099; model FX-600 and model FX-600FI from \$1,495 to \$1,249 and \$1,255 to \$1,099, respectively...Panasonic has also upgraded its Personal Partner hand-held computer to include two options: a 300/1200-bits-per-second (bps) Hayes-compatible modem

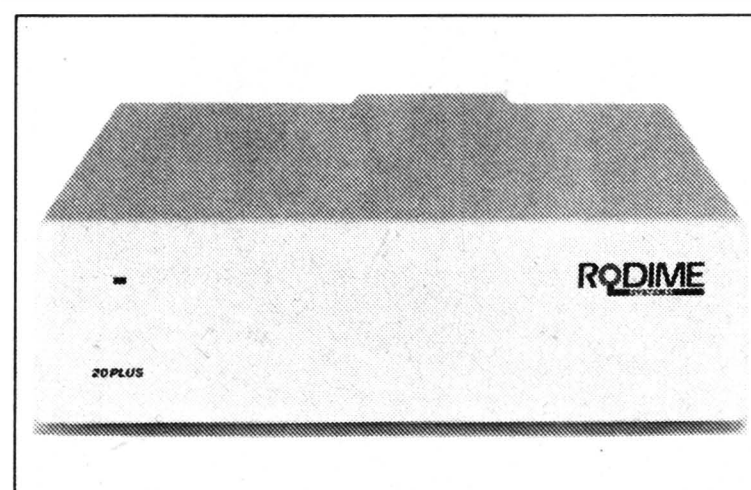


Hattori Seiko's MP-5300AI printer.

(\$330), and an RS-232C serial port board (\$160)...**Hewlett-Packard Co.**, of Palo Alto, Calif., has introduced the new Hewlett-Packard Expanded Memory Board that has 512k (\$695) for the HP Touchscreen Personal Computer... HP has also released a rack-mountable version of its AT-compatible Vectra computer, the Vectra Industrial PC (\$6,225), for use in harsh manufacturing environments.

Kentek Information Systems, Allendale, N.J., announced an enhanced version of its K-2 page printer, the K-2/300 (\$7,995). Its controller has gate array technology that produces faster bit mapping...**EVI/Fastcomm Data Corp.** has added a 19.2k-bps

Turbo model to its line of dial-up Fastcomm "All Speeds in One" modems. This adds error-free 19.2k-bps capability to a Fastcomm 2400- or 9600-bps modem, increasing data throughput by 60 percent. Prices range from \$999 to \$1,099, and current users can upgrade to a Turbo for \$100...**Microcom, Inc.**, Norwood, Mass., has added new network management capabilities to its line of error-correcting dial-up modems with the Intelligent Network Controller for its High Density Modem System. The Controller's prices start at \$1,499...**Penril DataComm**, Gaithersburg, Md., has incorporated 21 new features into its Datalink 4800 (\$1,295), 9600 (\$1,795), and 9600 Fast Train (\$1,995) modems...A version of the Dots-Perfect enhancement kit (\$79.95) for Epson MX, IBM PC, and IBM Graphics printers has been introduced by **Dresselhaus Computer Products**, Glendora, California. The product offers a near-letter-quality (NLQ) mode as an improvement over the standard draft mode...**Hattori Seiko Computer Peripherals**, Mahwah, N.J., has announced a wide-carriage version of the



Rodime's 20 Plus SCSI hard disk.

MP-1300AI dot matrix printer, the MP-5300AI (\$899). It prints at 300 characters per second (cps) and includes a cartridge ribbon that has a 12-million-character life expectancy.
SoftStyle, Inc., Honolulu, Hawaii, is now marketing a new version of Microsoft's MacEnhancer expansion system (\$245) for the Macintosh that functions as an intelligent data switch that expands a single Mac port into four ports. It now includes SoftStyle's driver software, enabling the Mac to connect to a wider variety of printers and other devices, and eliminating the need for extra driver software, cable reconections, serial-to-parallel converters, and modifications to the user's application software...**Rodime, Inc.**, Boca Raton, Fla., has released the Rodime 20 Plus (\$1,295) and 45 Plus (\$1,695) external hard disk drives for the Macintosh Plus. The drives use the computer's high-speed small computer system interface (SCSI) connector port, making them up to six times faster than hard drives that use the external floppy port...A 30-port version of the NetCommander intelligent data exchange from **Digital Products, Inc.**, Watertown, Mass., nearly doubles the number of ports offered by the earlier 16-port version. The sub-LAN NetCommander 30 is priced at \$3,895 for the 32k version and \$5,495 for the 500k version.

...Software Update

■ **Spellswell** version 1.3 for the Macintosh (\$74.95), from Greene, Johnson, Inc., Monterey, Calif., now handles spelling errors in documents created with Microsoft Works, Lotus' Jazz, and Living Videotext's More. New features include a 93,000-word dictionary, expanded proofreading capabilities, and shortcut option settings. Customers can upgrade for \$15; free upgrades are available to customers who bought the program after last October 1...**Quinsept Inc.**, Lexington, Mass., has released version 3 of **Family Roots** (\$185). Features of the program include nine additional user fields and additional space for marriages, children, and notes. Owners of previous versions can upgrade for \$39...**Pecan Software Systems, Inc.**, Brooklyn, N.Y., has acquired the rights to **Jack2** (\$99.95), an integrated package featuring word processing, graphics, data base, and spreadsheet modules. Pecan is selling Jack2 for \$49.95 for a limited

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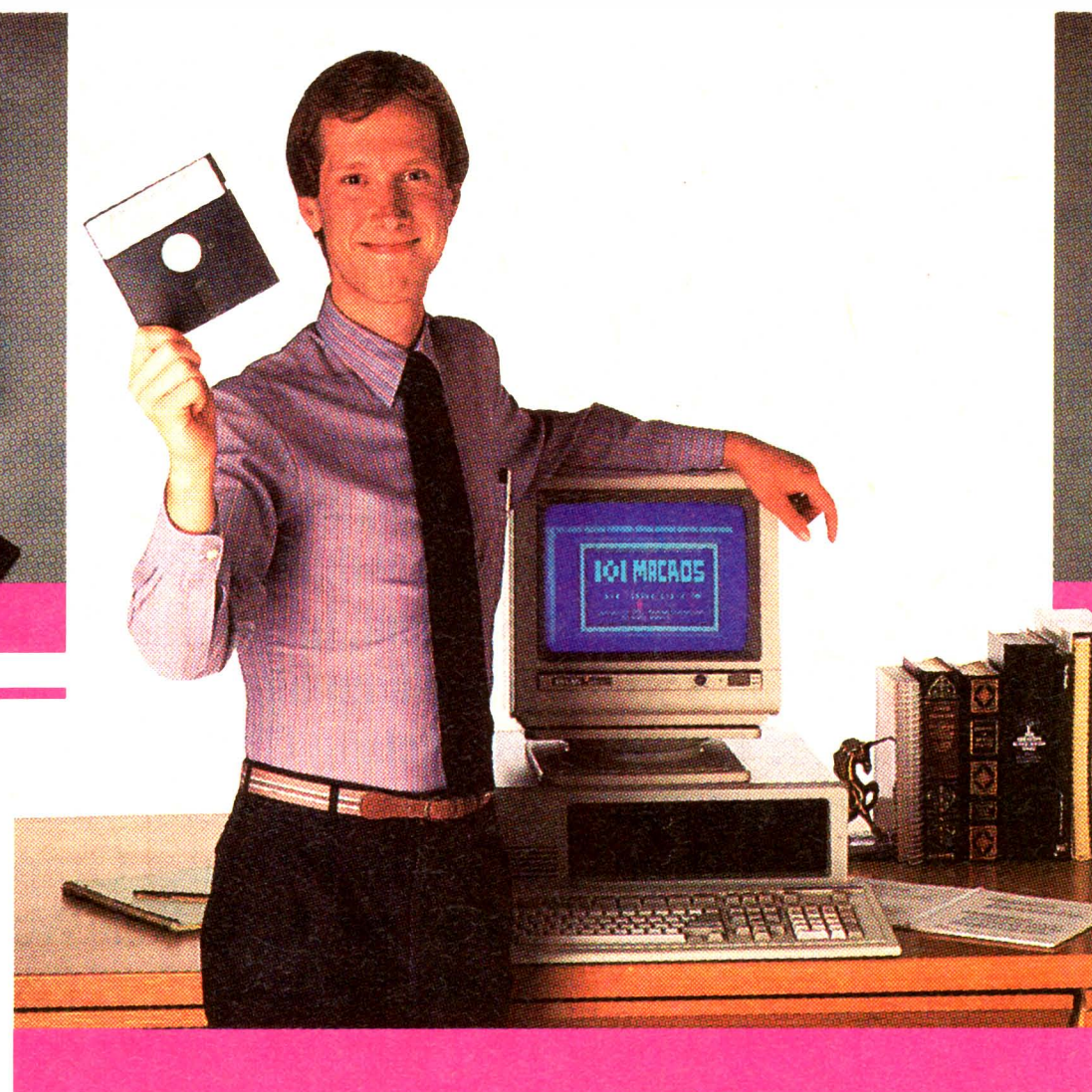
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UPDATE

time...Software Products International, San Diego, Calif., has announced that its **Open Access II Data Base and Spreadsheet** modules (\$395 and \$295, respectively) are now available individually.

Quarterdeck Office Systems, Santa Monica, Calif., and PC Designs Inc., Tulsa, Okla., have announced that it will bundle **Desqview** version 1.3 with the Grand Vitesse line of PC Designs computers...**PC MacBridge/Plus** version 3.0 (\$650), from Tangent Technologies, Norcross, Ga., now features an enhanced user interface, including pull-down menus; a LaserScript/Plus PostScript conversion program including pen plotter emulation; direct print options; direct support for all PostScript applications; and support for Microsoft Windows and Hayes' InterBridge. Customers who purchased version 2.00 through 2.16 after last August 1 can upgrade for \$50. Those who purchased version 2.00 through 2.16 prior to last August 1 can upgrade for \$75. Owners of earlier versions can update for \$100...**Turbo Maccountant** version 2.0 (\$495), from Digital Etc., Inc., Santa Monica, Calif., now includes advanced payroll functions, flexible budgeting, support for user-defined or preconfigured federal and state tax tables, and budgeting that enables income statements to be prepared three different ways. Customers can upgrade for \$95...The Dest Corp., Milpitas, Calif., announced that it will ship Silicon Beach Software's **SuperPaint**, a full-screen graphics and image editing program for the Macintosh Plus, as part of Dest's **Publish Pac** scanner software (\$595)...Productivity Software International, Inc., New York, N.Y., has reduced the price of **PRD+**, a keyboard/macro enhancement program designed to increase typing/data entry speed, from \$195 to \$68.

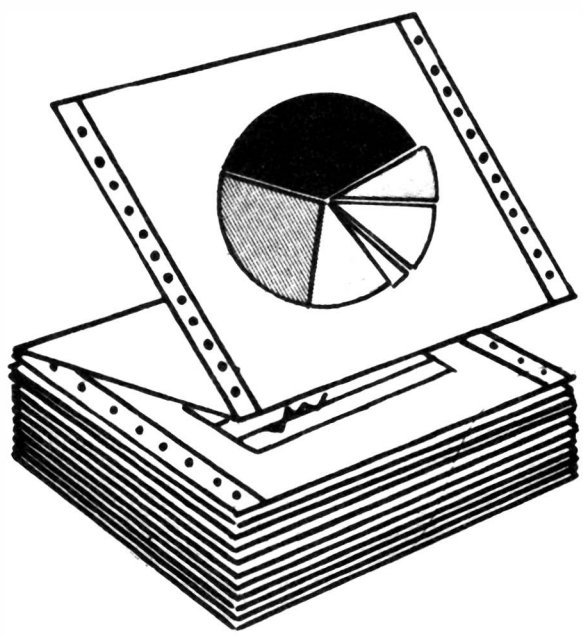
Visible Systems Corp., Concord, Mass., has released version 2.2 of **Visible Analyst Workbench** (\$1,785). Features of the new release include the ability to build a common data dictionary, move blocks, store a moved block as a construct, and support larger page sizes. An optional easel mode allows for a page size of 15 inches by 11 inches. Customers can update for \$150...RG Software Systems, Inc., Fort Washington, Pa., has removed all copy protection from version 4.0 of **PC Tracker** (\$495)...**Pro-Search** version 1.04 (\$495), from Personal Bibliographic Software, Inc., Ann Arbor, Mich., now supports the new two-step log-on procedure required for Dialog users. Also, copy protection has been removed. Revisions cost \$45 for Pro-Search owners, but are free to subscribers of the Pro-Search category-disk subscription service...Lattice, Inc., Glen Ellyn, Ill., has released version 3.10 of the **Lattice AmigaDOS C Compiler**, bundled with Lattice's Text Management Utilities for \$225; or the Professional Compiler, which includes the compiler, Text Management Utilities, Lattice Make Utility, Lattice Screen Editor, and the Metadigm MetaScope Debugger, for \$375. The new version features increased library modularity and new addressing modes that help reduce load module sizes by 20 percent. The new release also features faster pointer and integer math, direct support of the Amiga's FFP format library, and multitasking support. An upgrade is available to the Lattice AmigaDOS C Compiler for \$75 or to the Professional AmigaDOS C Compiler for \$225.

Hayes Microcomputer Products, Inc., Norcross, Ga., recently announced that its warranty program has been expanded to cover the performance of all Hayes software and hardware products. Any Hayes product purchased on or after last October 1 will be covered by the new warranty...Reality Technologies, Philadelphia, Pa., has announced a new price, \$69.95, for its business simulation software. **Business Simulator...The Tax Planner Template** (\$250), from Taxcalc Software, Inc., Fort

Worth, Texas, now incorporates the changes of the recent Tax Reform Act of 1986. The template includes all tax law changes for 1986, 1987, and 1988. Current owners of the Tax Planner may upgrade for \$150.

Hercules Computer Technology, Berkeley, Calif., has announced that the following eight software programs support the new Hercules Graphics Card Plus: **Manuscript, Nota Bene, Multi-Lingual Word Processing, Technical Scientific Word Processing, PS, SST, Flowcharting II+**, and **Language Design Kit...Primavision** version 1.07 (\$1,500), a plotter graphics package, now permits the plotting of the original target plan as a bar chart on which triangles denote the scheduled finish date or actual finish date for each activity. It is available from Primavera Systems, Inc., Bala Cynwyd, Pa. Customers will receive the upgrade free of charge...**Show Partner** version 2.0 (\$79) from The Marketing Channel, Ltd., Syracuse, N.Y., now runs any CGA or EGA four-color show on any computer system with CGA, EGA, or Hercules Graphics capability. Current users can upgrade for \$30...**RealWorld** Corp., Chichester, N.H., has released version 4.0 of **RealWorld** (\$695), which now includes a new purchase order component. Other enhancements to the program include: multicompany capability, on-line help, and an audit trail capability. Customers are able to upgrade for \$150...**Bluestreak Plus** version 2.0 (\$89.95), from Lang-Allan, Inc., Winter Park, Fla., now features keyboard mapping for up to 32 characters, and file transfer utilities. The package also offers a selection of terminal emulations (13 systems in all) and can be modified to emulate more. There is no charge for upgrades...Alpha Software, Burlington, Mass., has announced a new site-licensing plan available from retailers and value-added resellers. Under the plan, customers will be able to make unlimited copies of **Alpha/three**, a menu-driven data base manager that reads and writes dBase files...**Encore** version 3.1 (\$475) from Ferox Microsystems, Inc., Arlington, Va., now features screen data entry, a Lotus 1-2-3 release 2 interface, a CSV (Comma Separated Value) format for ASCII files, and a tax depreciation table. Customers who purchased Encore after last July 1 and those who have a maintenance contract will receive the new version free.

Irwin Magnetics, Ann Arbor, Mich., has introduced a utility program for its Backup-brand tape drives. **EzTape** features displays that are designed to speed and simplify protecting data stored on hard disks. The program is now included with all Backup tape drives and will be available to current users of Backup for \$74.95...**S.O.S.** (\$49.95), from Goldata Computer Services, Inc., Bryn Mawr, Pa., a utility that saves Lotus 1-2-3 (releases 1A and 2.0) and SuperCalc 4 spreadsheets in RAM to disk, has been adapted to work with MultiMate...Best Programs, Alexandria, Va., announced that the **PC/TaxCut Tax Planner**, which is usually published as part of the PC/TaxCut Tax Preparation Program (\$145), is available this year as a stand-alone program. The program has been revised in keeping with the Tax Reform Act of 1986 and retails for \$15...SoftStyle, Inc., Honolulu, Hawaii, has released version 2.5 of the **Start Products** (Epstart, Epson printers; Jetstart, HP ThinkJet and QuietJet; Laserstart, HP LaserJet series; TI-start, TI 855/865 and 850/860XL printers; and Toshstart, Toshiba printers) (\$45 to \$95). The new version is now compatible with the Macintosh Plus, Macintosh 512k Enhanced, and version 5.3 of the Finder. New features include improved word spacing and tabbing in text mode, faster printing speeds, and four new fonts (pica, elite, compressed, and proportional). Upgrades to version 2.5 are currently available for \$15 to registered owners of the program. ■



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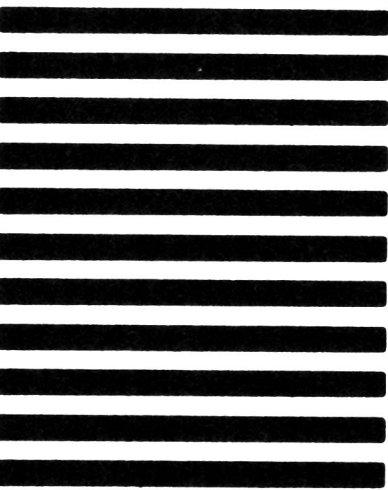
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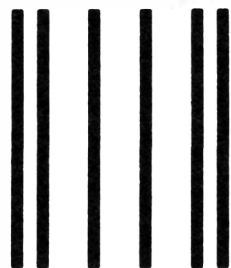
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—PERSONAL COMPUTING, July 1986

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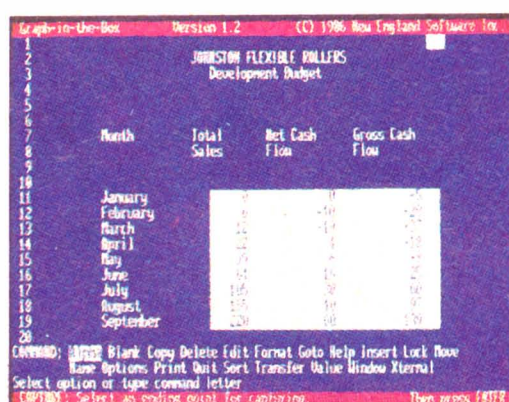
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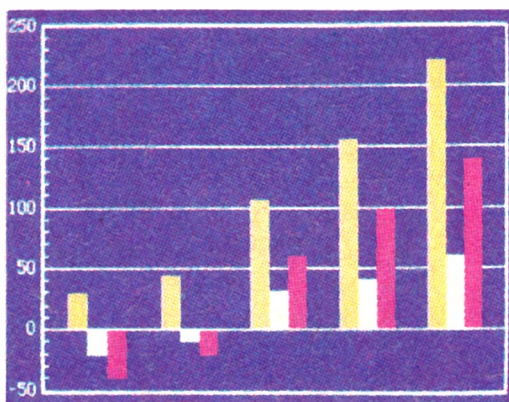
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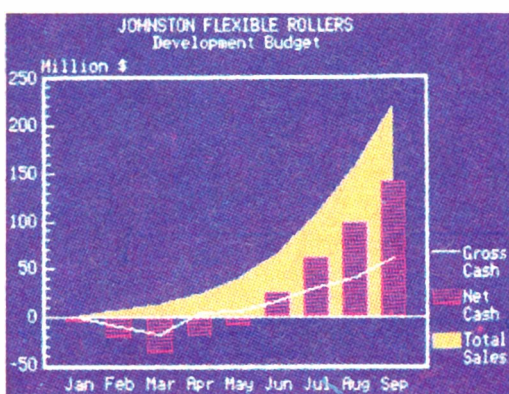
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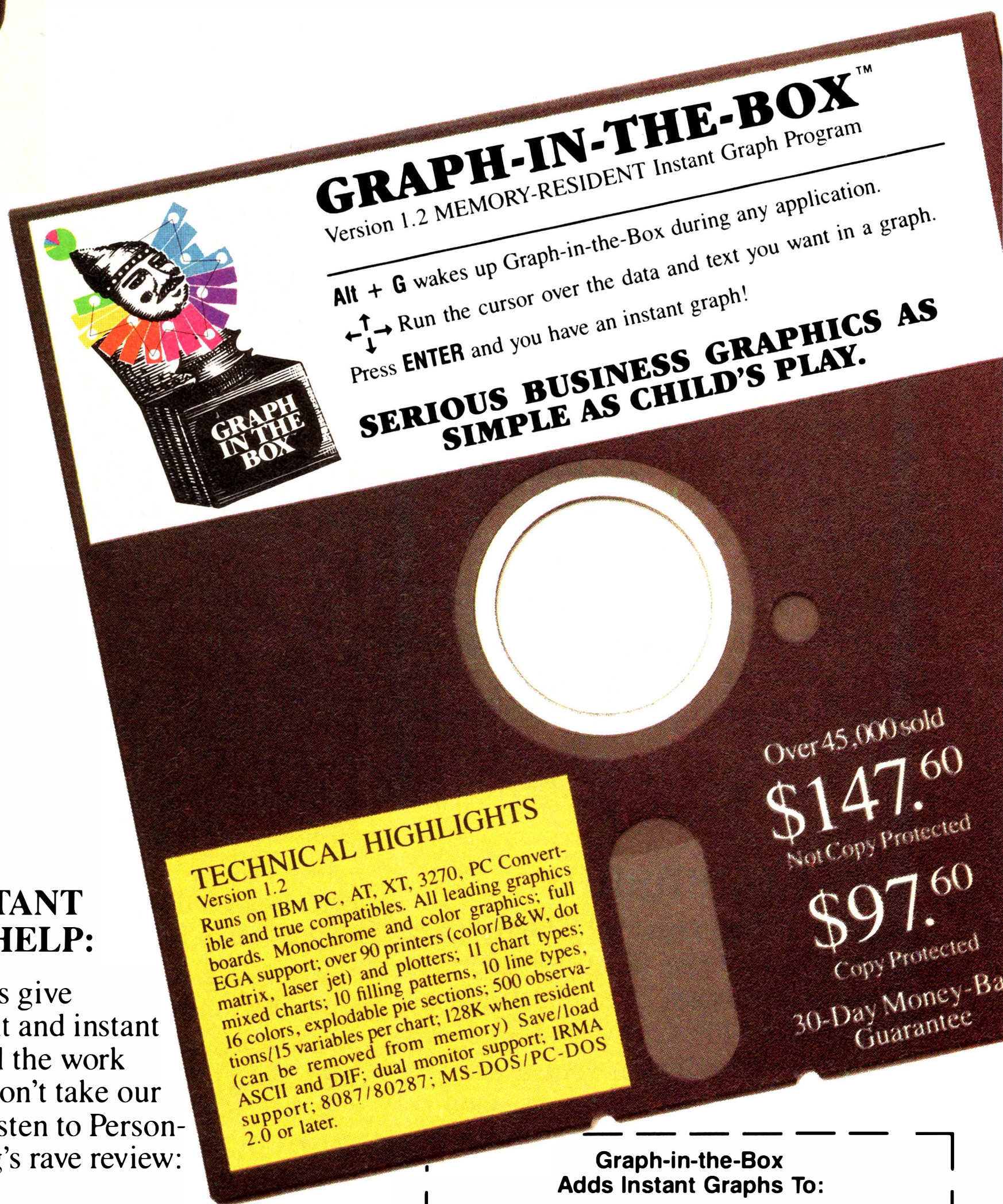
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Michael Antonoff

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And if you're an advanced 1-2-3 user, Lotus HAL will show you new features and functions that will add extra flexibility to the power of 1-2-3 you've already tapped.

How does Lotus HAL do all this—for all users?

Easier Commands

Lotus HAL makes executing 1-2-3 procedures even easier than before. Because it accepts phrases like "total sales," "graph Jan to Mar," or "copy this to A10," etc. In fact, Lotus HAL's vocabulary includes English words and phrases. So you can customize a command dictionary of your own—with the words and operations you're most used to and most comfortable using.

Since Lotus HAL makes 1-2-3 more accessible for all users, you'll learn more—in less time—about all the capabilities of 1-2-3.

For instance, if you're presently using only the spreadsheet, Lotus HAL will show you how to create graphs and do database functions—far more simply than ever before.

Time-Saving Shortcuts, Easy-To-Create Macros

With Lotus HAL, you'll take shortcuts and accomplish multi-step tasks quickly and easily. So you'll greatly reduce errors—and save time.

And, with a simple "undo" command, Lotus HAL even lets you recover from errors you've already made. So if you're a novice user, you'll learn faster and with greater confidence. And if you're an experienced user, you can experiment more freely and do "what ifs"—without fear of having a mistake destroy hours of work.

Lotus HAL also makes developing macros simpler than ever—so simple, in fact, that even novice users can create 1-2-3 macros with Lotus HAL. And no matter how familiar with 1-2-3 you are, you'll benefit from being able to write and test macros to make sure they do what you had in mind.

New Power

Lotus HAL will let you take 1-2-3 as far as you need. And if you've been taking it far already, Lotus HAL offers you new commands that will further enhance your productivity.

For example, Lotus HAL lets you replace items anywhere in the worksheet (even within formulas), and create a dynamic link between cells in multiple worksheets. It also lets you audit your worksheet—so you can find mistakes without having to review the entire sheet "manually."

Best of all, while Lotus HAL greatly enhances 1-2-3's commands, it doesn't change either 1-2-3 or the worksheet. It's always available, but it never gets in your way. And you can share data as freely when you're using Lotus HAL as you did when you were using 1-2-3 alone.

In fact, you can do everything you've ever done with 1-2-3 even better... plus a great deal more.

And since Lotus HAL is part of the 1-2-3 system—and the Lotus family—you get an unparalleled commitment to customer service and support that will keep you up and running.

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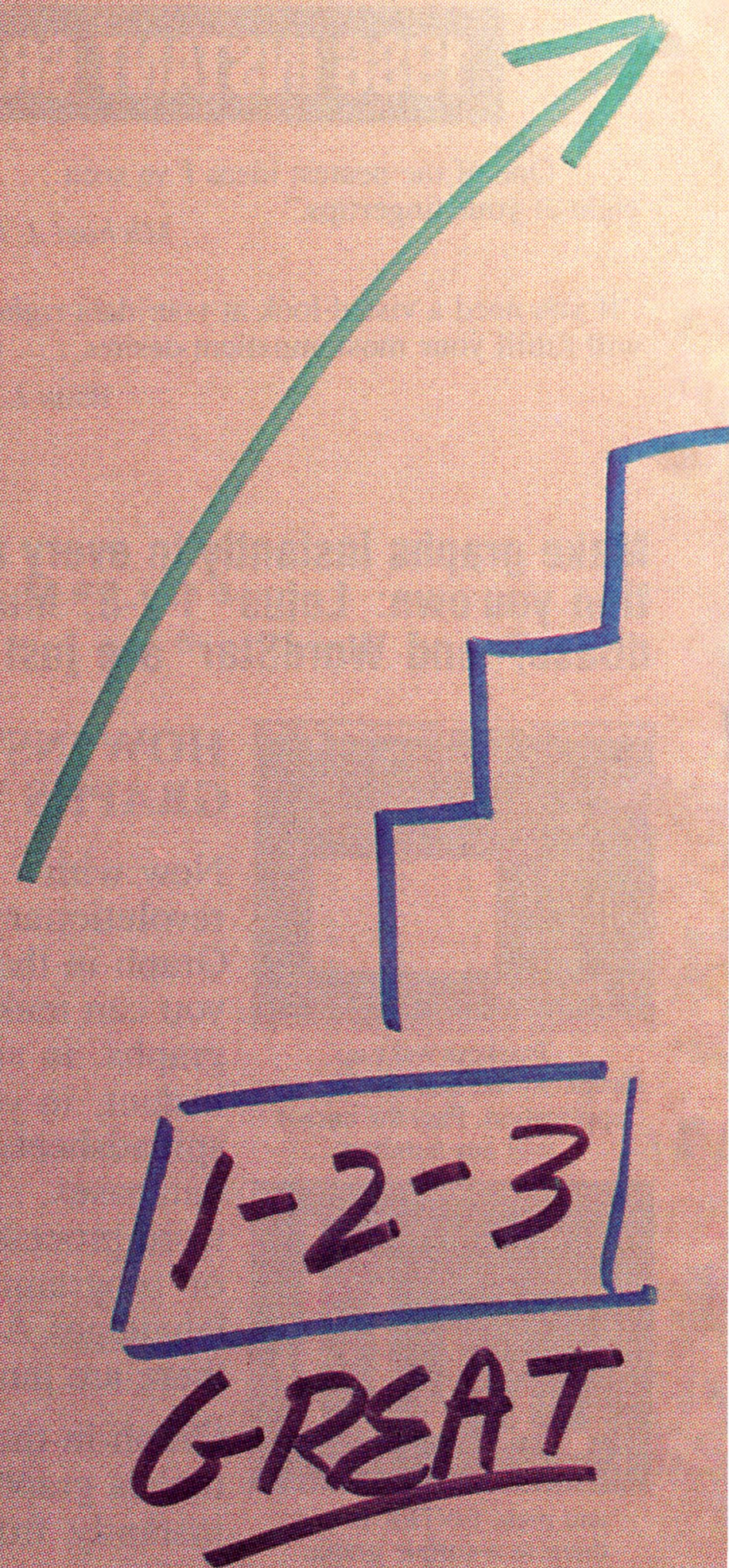
System Requirements.

Lotus HAL requires 1-2-3 Release 1A, Release 2 or Release 2.01 for personal computers from IBM*, COMPAQ, and AT&T, plus 1-2-3 Certified Compatibles; DOS 2.0 or higher. Please refer to your 1-2-3 package or 1-2-3 documentation for appropriate hardware configurations and DOS requirements or consult your dealer.

Lotus HAL resides in memory with 1-2-3 and operates with it; a minimum system configuration of 512K is required.

*Lotus HAL does not operate with 1-2-3 for the IBM PCjr (ROM version), IBM PC Convertible or Release 1A for the IBM 3270 PC.

THE
1-2-3

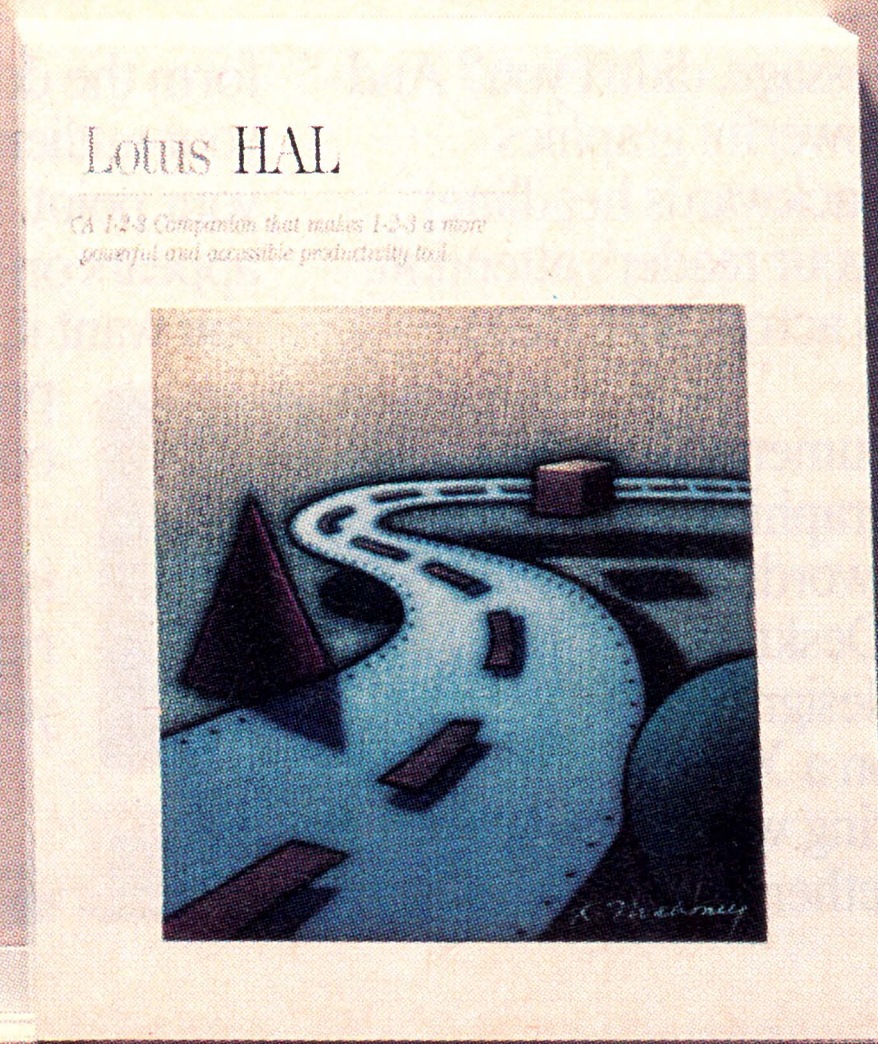


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And, you'll do so at a remarkably low price. Because Lotus HAL costs only \$150.

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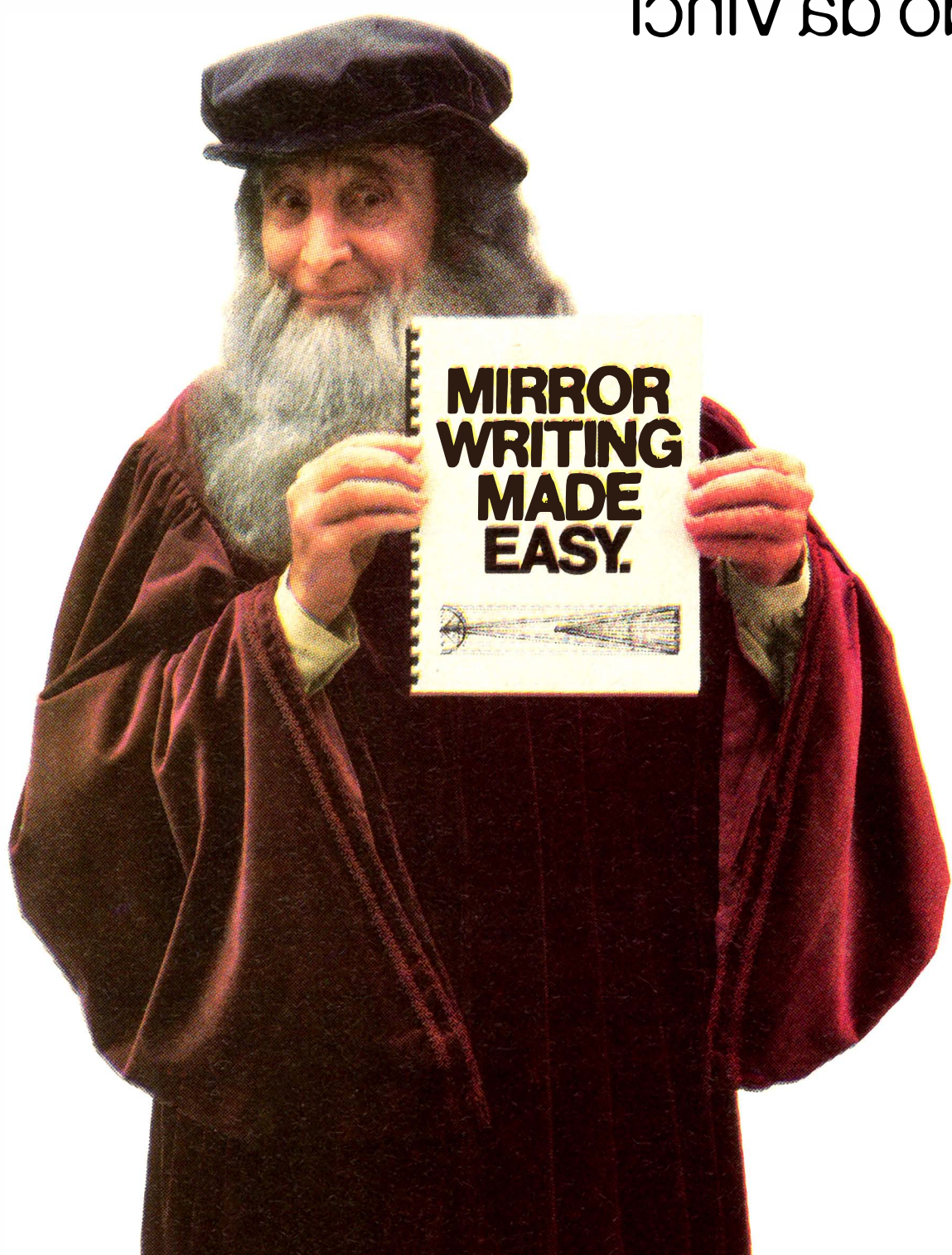
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Leonardo da Vinci



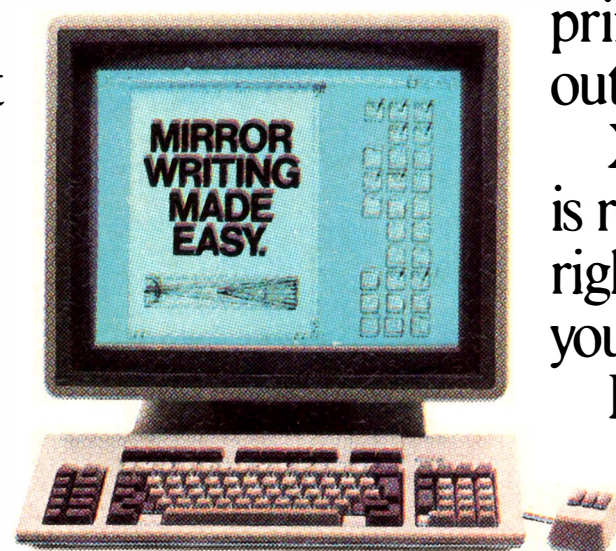
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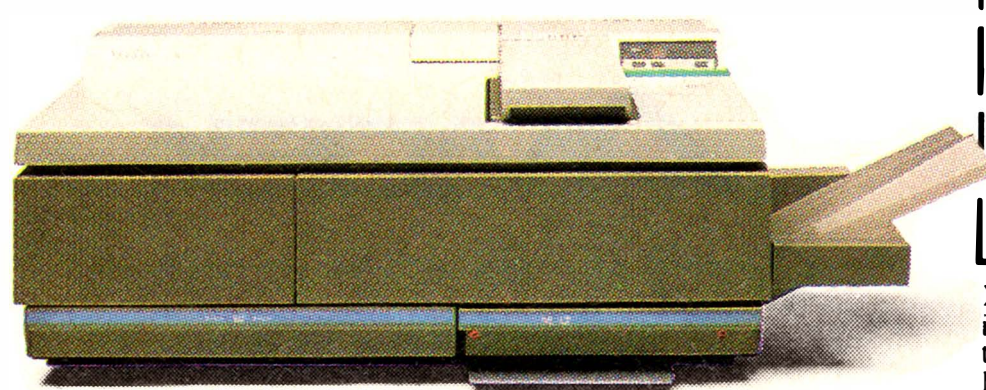


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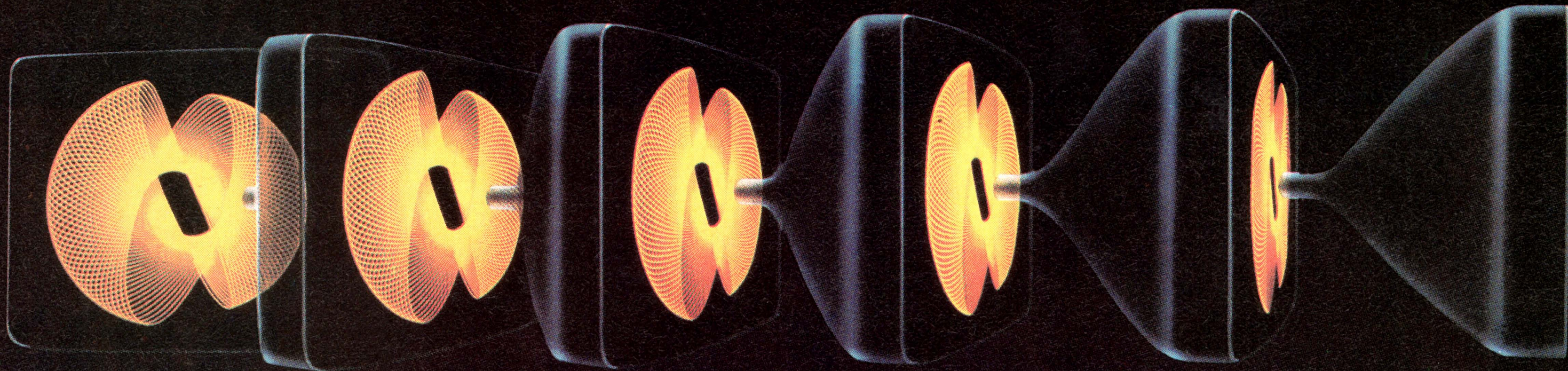
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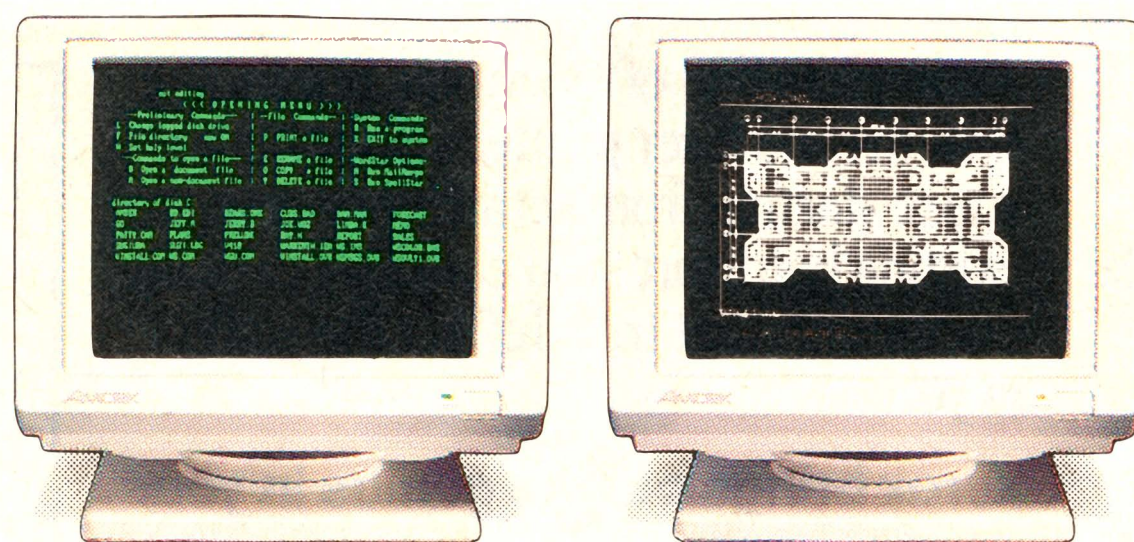
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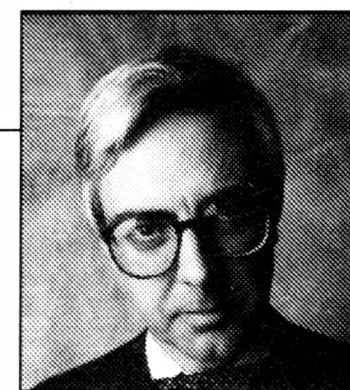
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The Software Imitators

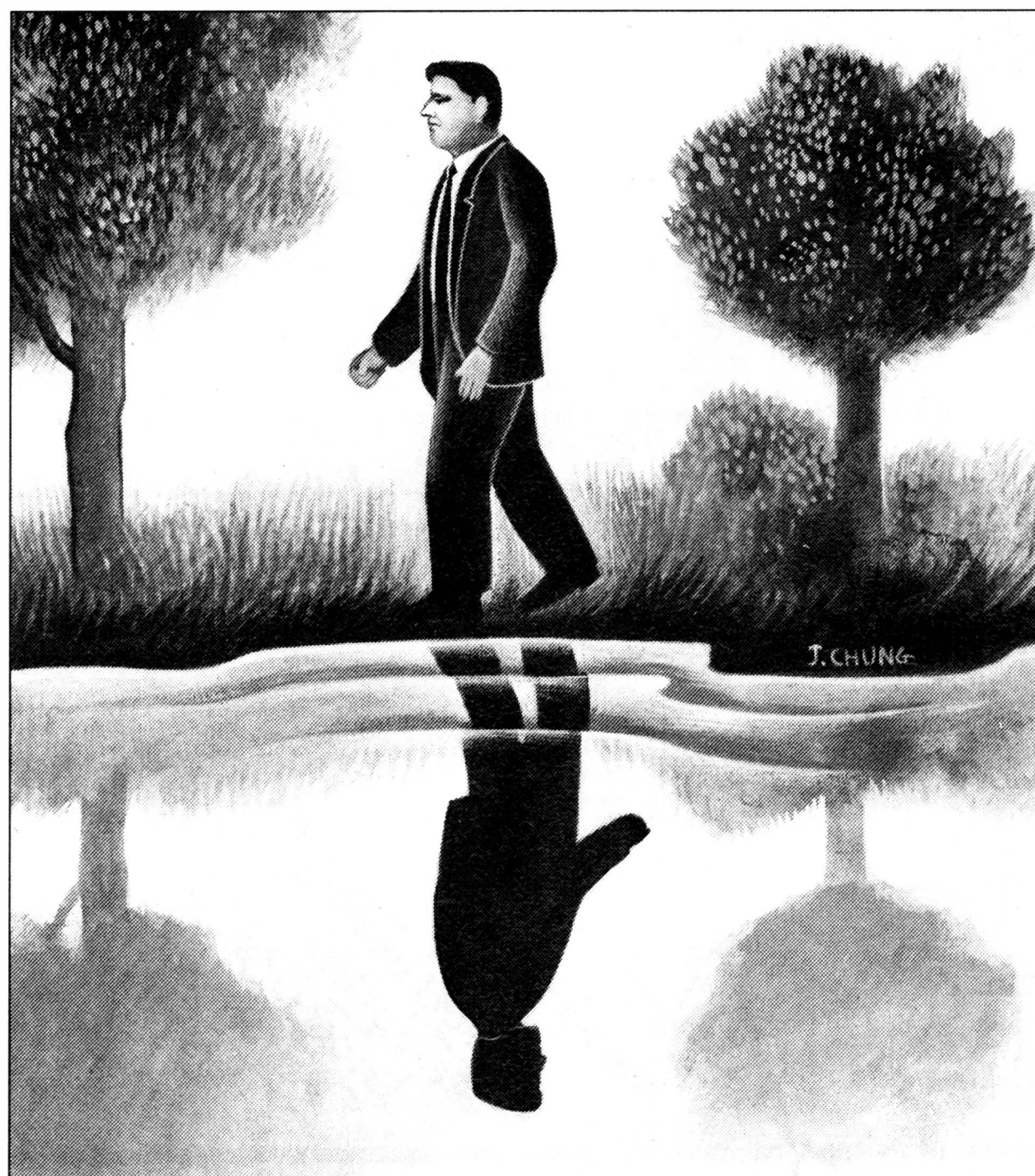


by Richard A. Shaffer

Adam Osborne was not the only one who thought that imitations of brandname software would sell better than they have. So did I. A year or so ago, most of us who make our living predicting the future of the industry expected that knockoffs of 1-2-3, dBase, or WordStar would have amounted to something by now. Why they haven't may help explain why I still believe they will and why two programs developed late last year—Words & Figures from Lifetree Software and 259 from Ontio Software—are worth paying attention to.

Over the last several months, one force behind the steadily rising prices of shares in Lotus Development Corp., Ashton-Tate, and Microsoft has been the spread of the inexpensive clone computers, whose buyers want industry-standard software. But why would anyone who is unwilling to spend more than \$1,000 for a computer spend that much or more for a couple of programs to run on it? How much longer will the leading software companies continue to benefit from the rise of hardware clones if price-conscious buyers can purchase reliable, trusted, well-distributed imitations?

The answer depends partly on the courts. The future of software clones is murky because it may be illegal not only to copy software but also to imitate its "look and feel." But if the legal issues are resolved, then those three adjectives—reliable, trusted, and well-distributed—become important. Lotus 1-2-3 has withstood imitators, in part, because the original was a world-class programming feat. Copies don't work as well. In addition to being not quite compatible, for example, Paperback Software's VP Planner is slower than 1-2-3 and likely to remain so because it is written in Forth instead of Assembler. Words & Figures, however, is a very good imitation of 1-2-3; I didn't notice the difference, except



that in some ways Words & Figures is better. Although I haven't tried 259, computer maven friends who have tell me it's highly compatible with 1-2-3 macros, keystrokes, and file structures. Because it is written in C, it does recalculate more slowly than 1-2-3. But at a low enough cost—the \$30 of Ontio's 259, for instance—people will try a software clone if reviews are favorable. Previous clones were too expensive.

Trust will take longer to build—long enough that clone makers will need low-overhead business strategies to survive, unless they can sell their imitations in bulk to other companies that already have distribution in place. In other industries, small companies often adopt such a private-label strategy and make, for instance, vacuum cleaners that are resold under the Sears label.

One reason that software imitators to date have fared poorly in comparison to their hardware counterparts is the inability of the distribution channel to profit from software of whatever sort. For instance, I'm certain that Businessland, which has difficulty enough profiting on a \$400 sale of 1-2-3, has no interest in a \$30 software package. Even if the gross profit were 100 percent of the

retail sales price, the profit in absolute dollars is too small to justify the time it takes to make the sale. Suppose, however, that Businessland could slightly modify Ontio to run on Businessland networks and resell copies 50 at a time under a \$2,000 site license. Thereby hangs a profit.

And in addition, Businessland would be helping Ontio surmount the trust barrier by putting its own good name on the product. Would such a move put Businessland into conflict with Lotus, whose 1-2-3 it carries? Not really. Those who buy clones are price-driven buyers who, by definition, weren't in the market for the expensive original. Businessland already resells Wyse's IBM-compatible personal computer under its own name, and yet it still carries IBM computers.

At \$30 suggested retail, the second- and third-tier makers of PC clones could afford to toss in copies of the software clones, bundling some applications with the system as Adam Osborne did so successfully in the early days of his portable Osborne computer. Similarly, retailers could afford to use the software as a traffic builder, advertising it at giveaway prices to get customers into the store. They could toss it in with the hardware for free to close a sale, assuring customers that because it runs like 1-2-3 they can always come back and buy the real thing without losing data or macros.

Mind you, I am still not convinced that software clones are the big deal I once took them for. But I have begun to see how small companies might be built around them, provided their expectations are modest enough.

If I'm right, software could begin to split along two paths, just as hardware has. Many buyers will continue to prefer the high road, purchasing original software to get the updates, warranty, manuals, add-ons, and other benefits. But other customers will take the low road, buying clone software for clone computers. ■

Richard A. Shaffer is the editor and publisher of the COMPUTER LETTER, a weekly industry newsletter.

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bar, and line graphs. Speed tests
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programs. The 1987 schedule will kick off with word processing
ages in January and project management software in February.

Software Digest Rating	Overall Evaluation	Program Name	Version Tested	Ease of Learning	Ease of Use	Error Handling	Performance	Versatility	Memory Requirement	Price	Volume Purchase Discounts	Program Can Be Copied	Demo Disk Available	Page
★★★★★	8.6	Harvard Presentation Graphics	A.01	■	■	■	■	■	256K	\$395	✓	✓	✓	26
★★★★★	8.4	Chart-Master	6.2	■	■	■	■	■	192K	\$375	✓		✓	14
★★★★	7.6	GEM Graph	1.0	■	■	■	■	■	320K	\$249	✓	✓	✓	18
★★★★	7.4	Picture Perfect	3.4	■	■	■	■	■	384K	\$295	✓			36
★★★★	7.2	Microsoft Chart	2.0	■	■	■	■	■	256K	\$295	✓	✓	✓	28

Ratings Key

(On a scale of 0 to 10)

OVERALL EVALUATION

★★★★★★ 9.0 or higher

★★★★★ 8.0-8.9

★★★★ 7.0-7.9

★★★ 6.0-6.9

★★ 5.0-5.9

ALL OTHERS 0.0-4.9

Lots of experts are putting Harvard Presentation Graphics (HPG) at the head of the class. Software Digest gives HPG their highest rating ever for a business graphics package — a rating won for superior performance, combining quality output and fast creation of graphics.

PC Magazine names HPG a “superb choice” because it’s “flexible, fast, easy to use and well thought-

out.” They rank HPG as a “first-rate graphics package.”

Infoworld calls Harvard Presentation Graphics “an elegant and intuitive program,” that is also “powerful and versatile.”

And, according to PC Week, “the real key to a presentation graphics package is output, and this is where HPG really shines.”

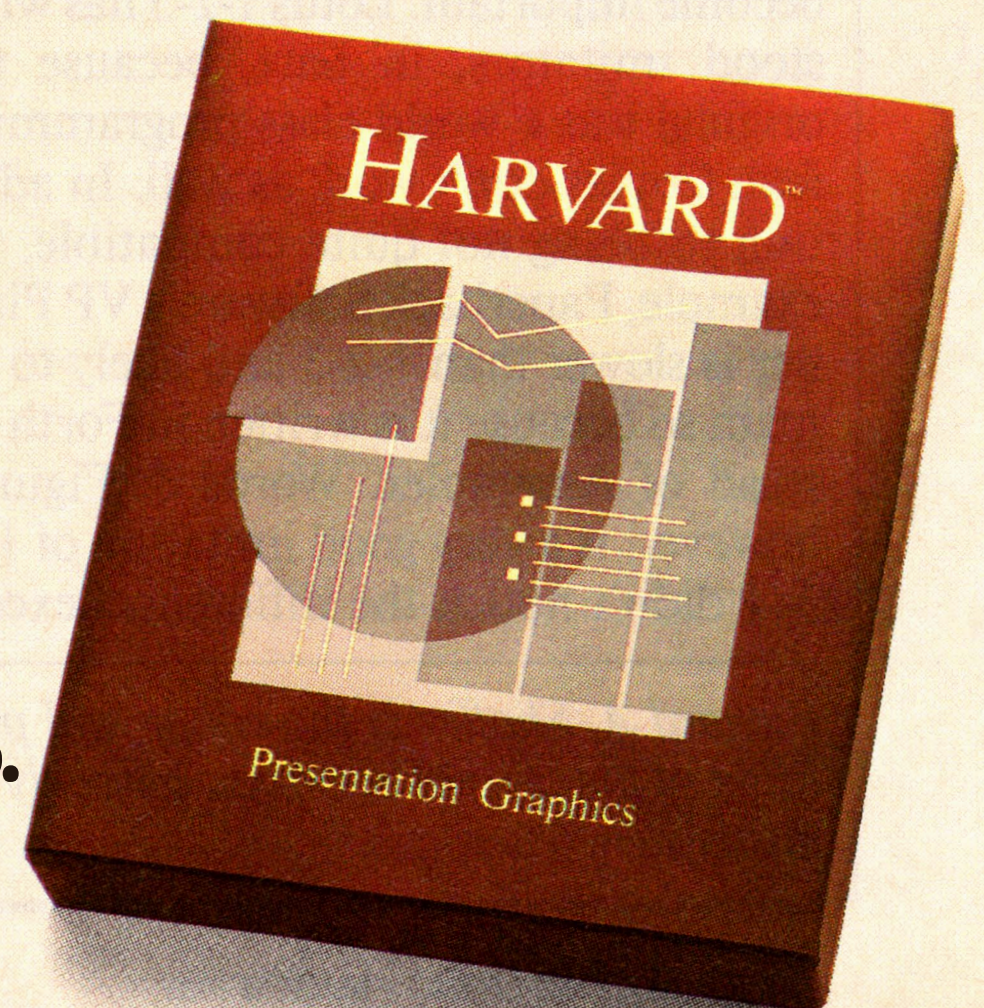
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by Miriam Liskin

Mastering Printer Drivers

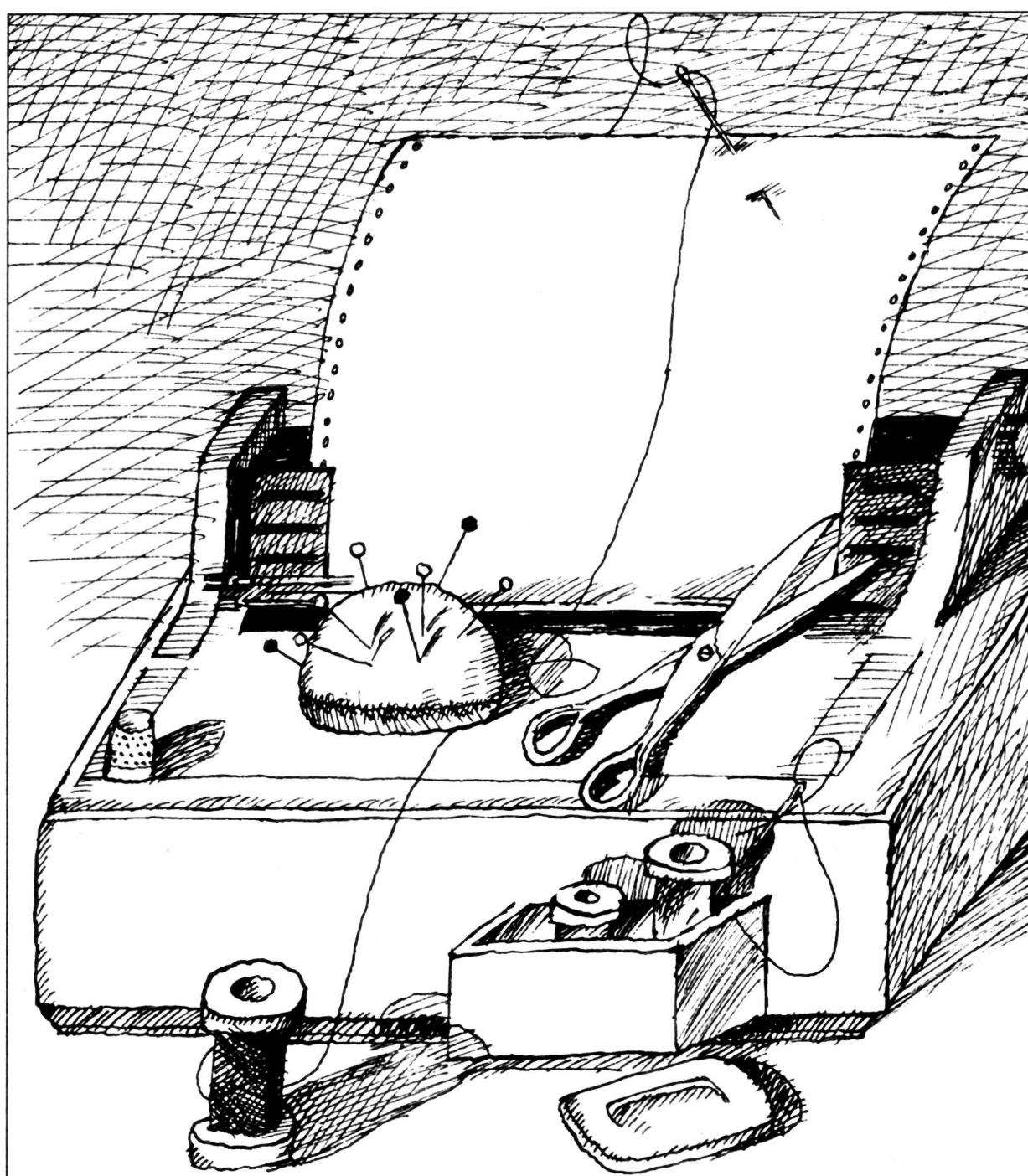
There's no doubt that printers of all kinds are getting faster, less expensive, and more sophisticated. Dot matrix and laser printers today offer more print enhancements and more typefaces in more sizes—all for less money than ever before. If you are lucky, accessing a new printer's special features will be a simple matter of selecting your printer from the menu of choices presented by the installation program that is provided with each of your application programs.

Not all of us are so fortunate, however. In an industry generally lacking in standardization, there is no reason to suppose that printers from two different manufacturers would use the same commands to access the same special features. To make full use of a printer's capabilities, the authors of a program must provide a driver—a program that sends the right codes to the printer to activate those features you want—tailored specifically for that printer.

You may have just purchased a brand new model ABC printer that is not yet supported by the current version of the XYZ word processing program. For that matter, if you are satisfied with the older version of the software, you may be reluctant to pay for an upgrade just to gain additional printer support.

You may have purchased an "Epson-compatible" or a "Diablo-compatible" printer, only to find out too late that it isn't quite 100 percent compatible. With a model that does offer true emulation of another manufacturer's printer, you may prefer to use it in its native mode to take advantage of features not available in the emulation mode. Or you may simply want to make your favorite word processor's font designations be more consistent with your company's typesetter or with other programs that are used in your office.

Switching to a smaller type size to



print a wide spreadsheet or using a near-letter quality (NLQ) mode for an accounting report is relatively simple. First, you need to determine from the printer manual which codes will turn on the features you want to access, and then ascertain from the software documentation how to send those codes to the printer. Your application software itself may provide the means—in the form of a "setup" or an "initialization" string. If not, there are pop-up and stand-alone utilities for this purpose, both public domain and commercial; in the worst case, you (or a more knowledgeable associate) can write a short program in Pascal or Basic.

Many word processors also offer a means for sending any arbitrary command string to the printer to utilize print attributes that are not otherwise supported. Many programs allow you to enter printer commands by typing their ASCII character codes on the numeric keypad while holding down the <ALT> key. Volkswriter uses the dot command `..CMD`, followed by any ASCII character codes, to send longer command strings to the printer, and WordPerfect has an "Insert Printer Code" command included in its "Print

Format" (<ALT-F8>) menu.

The problem is that what you can accomplish this way is limited by the fact that the word processing program cannot take these "unknown" codes into account in formatting the surrounding areas in a document. This is, of course, true with your spreadsheet program as well, which does not "know" whether you have switched to compressed print before printing a worksheet—it is your responsibility to ensure that you have chosen margin settings appropriate to the selected combination of character size and pitch.

With spreadsheet, data base, or accounting programs, this is not often a serious problem, since your most frequent requirement—and often the only one you can easily accomplish without

custom programming—will be to switch type styles once, and use the new font for the entire printout. To use compressed print for a spreadsheet or data base report, for example, you would send a setup string containing the code to turn on compressed print to the printer prior to printing the report. You need not be overly concerned with how to turn off the special print modes, since you can always restore the printer to its default state by turning it off and then back on again.

Word processing applications, however, introduce a host of additional complications, primarily because the software dynamically adjusts the line width and intercharacter spacing, either as you enter text or as it prints a document. If you enter unsupported printer control codes into a file, the program cannot take the resulting font changes into account in forming your text into lines, paragraphs, and pages.

To start with some simple examples, suppose that you have set the line width (the space between the left and right margin column settings) to 65 characters, so that your text, printed at 10 pitch (10 characters per inch), will be centered horizontally on an 8.5-inch

Miriam Liskin, a Berkeley, Calif., writer and consultant, is the author of ADVANCED dBASE III: PROGRAMMING AND TECHNIQUES.

TIPS

page. You can safely embed a command to access an otherwise unsupported 10-pitch print mode on your dot matrix printer.

However, if you switch to an elite (12-cpi) or compressed (typically between 15- and 17-cpi) font, the left margin will appear too narrow on the print-out and the right margin will appear too

wide. Using a different type size for a word or phrase in justified text may make the affected line too short or too long to align with the rest of the text. And if you try to print a centered title in a larger typeface, the starting position of the title will be the same as if you were still printing at 10 pitch—too far to the right for the larger-size characters.

The reason is that the program is calculating the margins and line width in units of characters, and will still send only 65 characters per line to the printer. This is true even with a program like Microsoft Word, which allows you to specify the margins in inches (among other units), since the software takes into account which font is selected when you set your margins. Only if you switch type sizes by using a word processor's own commands can the proper conversions be made.

Some of these problems can be solved using the standard command set of your word processor, provided that you are willing to forego right-justification, to adjust the margins yourself every time you change print size, and to experiment with the placement of large centered titles.

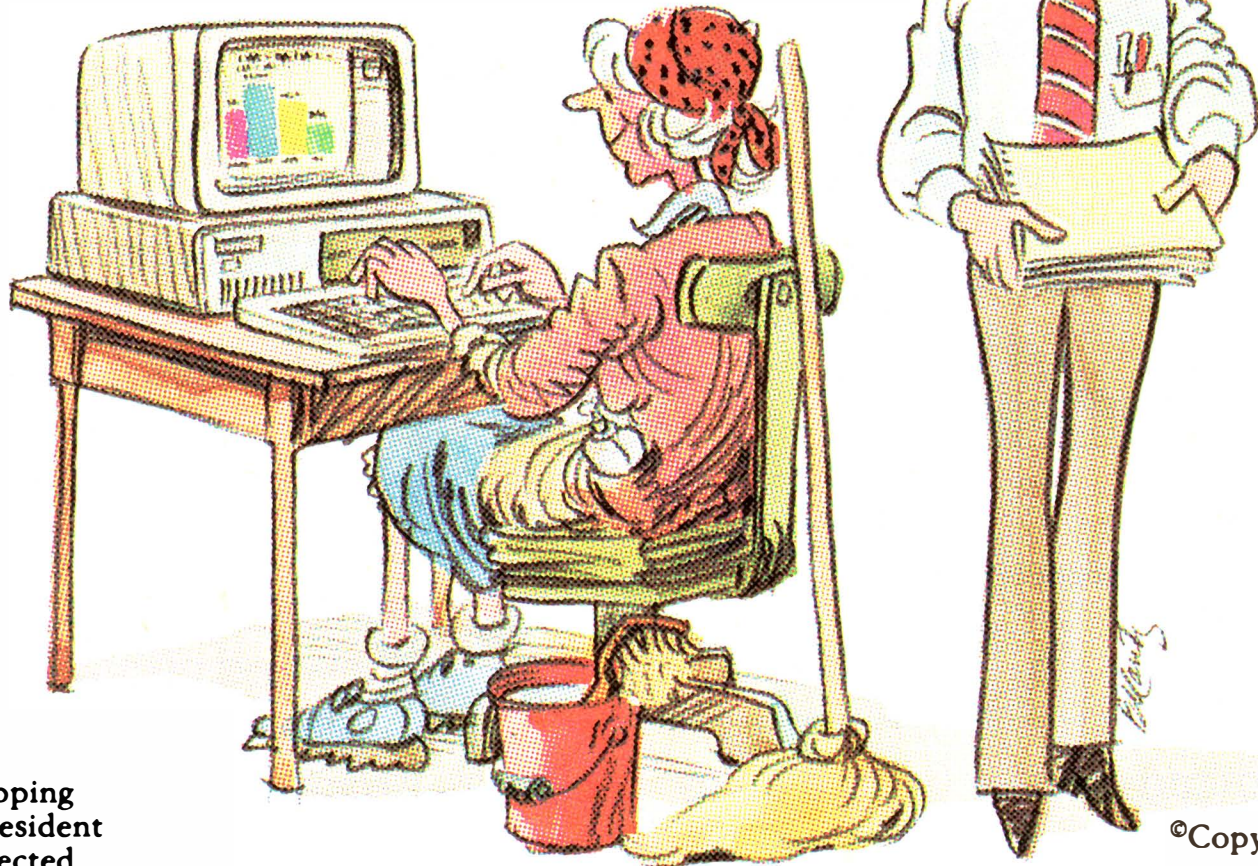
For more sophisticated requirements, these stopgap measures will fall far short of the desired goals. If you want to switch type sizes for a few words in the middle of a line, your right margin will be wrong on that line. Using proportional spacing is even more complicated, since each character is a different width, with letters like "i" and "l" taking up the least space and letters like "M" and "W" occupying the most.

If you turn on a built-in proportional font that is unknown to your word processing software, which still assumes it is using monospacing (i.e., each character is the same width), lines containing many wide letters will extend beyond the right margin, while lines containing a disproportionate number of narrow letters will be too short.

Some programs can print proportionally spaced text on any printer that can move its print head in small enough increments to adjust the intercharacter spacing—the program actually sends a command to the printer after each character to specify how far to move the print head before striking the next character. But even when using a printer's built-in proportional fonts, the program must at least know the relative widths of the characters so it can calculate how many characters belong on each line.

Fortunately, the days are largely past when the only way to install a new printer was to edit and reassemble the driver program or patch the software with a debugger like DDT (under CP/M) or DEBUG (in MS-DOS). Programs like WordPerfect and Volkswriter 3 come with printer configuration utilities that allow you to create a custom

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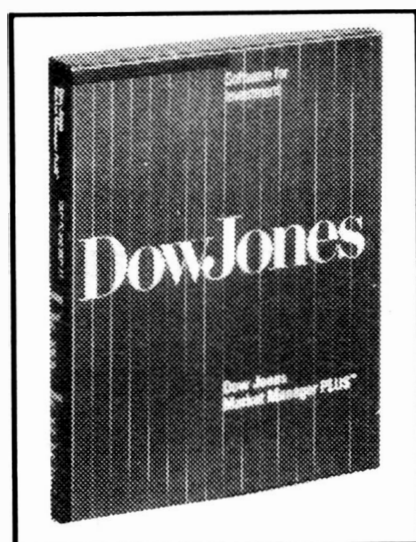
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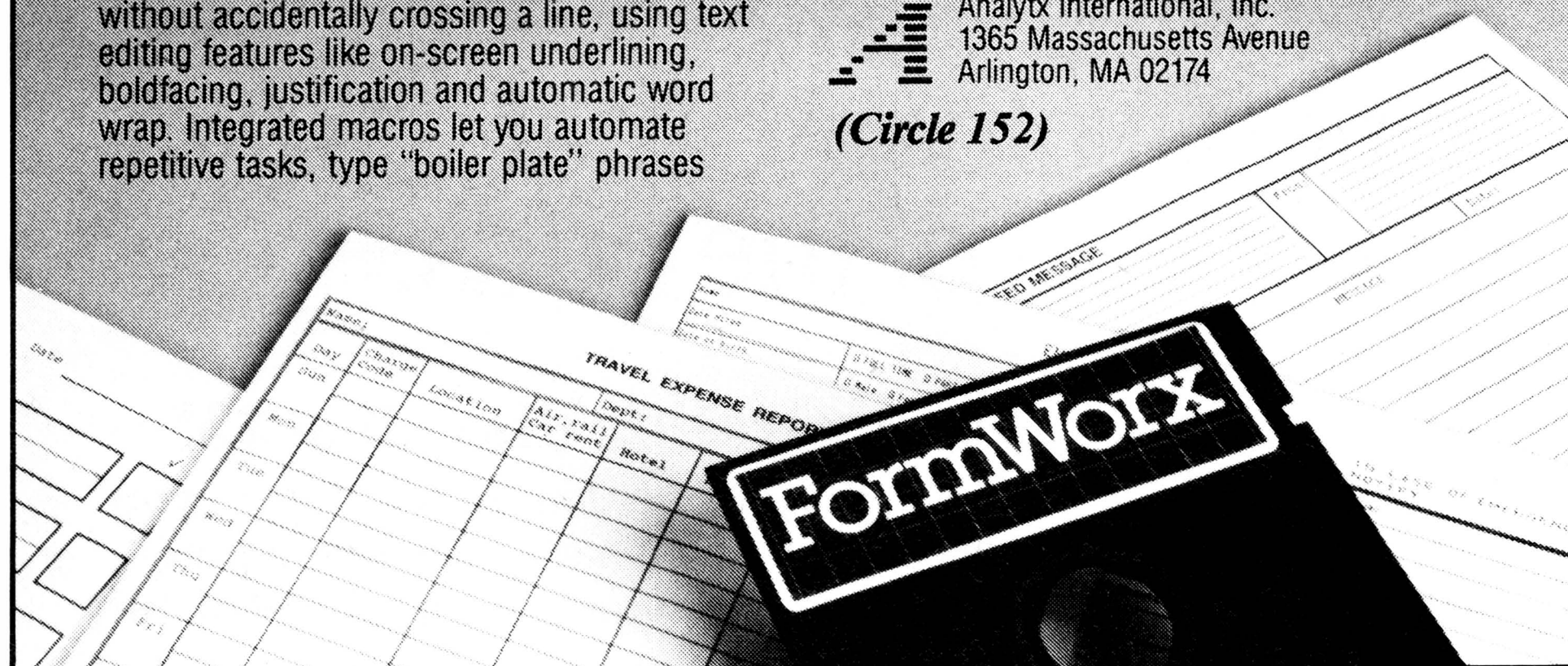
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printer driver by answering a series of questions. But even running a completely menu-driven printer installation program requires understanding quite a bit about the mechanical operation of your printer and about how it may be controlled through software.

The first prerequisite is a grasp of the types of commands used and how they are expressed. Most printer commands are either single "control characters" (characters with ASCII codes between 0 and 31 decimal) or "escape sequences" (commands beginning with the ESCAPE character, which has a decimal ASCII code of 27) of varying length.

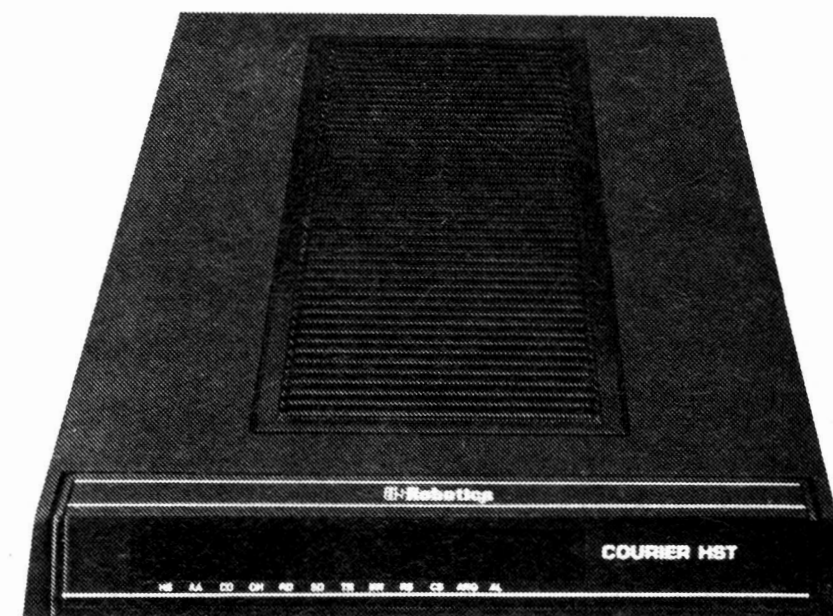
You can usually find a list of these codes in your printer documentation. Sometimes the information is clearly laid out in plenty of detail for the average computer user, while in other manuals there is only a terse command list in an appendix.

The printer commands, especially the non-printable characters that have ASCII codes between 1 and 31, and which have no standard graphic representations, may be expressed in a number of different ways, some of which may be found in the same manual. The most common representations use the decimal (base 10) ASCII codes, hexadecimal (base 16) ASCII codes, and mnemonics (abbreviated names). The characters "Control-A" through "Control-Z" may also be written using the abbreviation CTL or CTRL or the symbol ^ for "control," sometimes with the entire expression in brackets. Occasionally you'll find binary (base 2), or some entirely different system.

For example, "Control-O," which turns on compressed print on Epson printers, may be written as 15 (decimal), 0F (hex), 1111 (binary), ^O, [CTRL-O], <CTL-O>, or SI (the mnemonic, an abbreviation for SHIFT IN). A good ASCII table—such as SideKick's, or the one in the IBM PC Basic manual—that lists the decimal, hexadecimal, control, and mnemonic representations for the 256 ASCII characters, can be invaluable in interpreting printer codes. One code worth memorizing is "escape"—the prefix for almost all printer command sequences you'll encounter. This character, whose ASCII code is 27 decimal, or 1B hexadecimal, is referred to by its full name, its mnemonic (ESC or <ESC>) and a number of less standard notations, including, in the HP LaserJet manual, a superscripted "E" followed by a "c."

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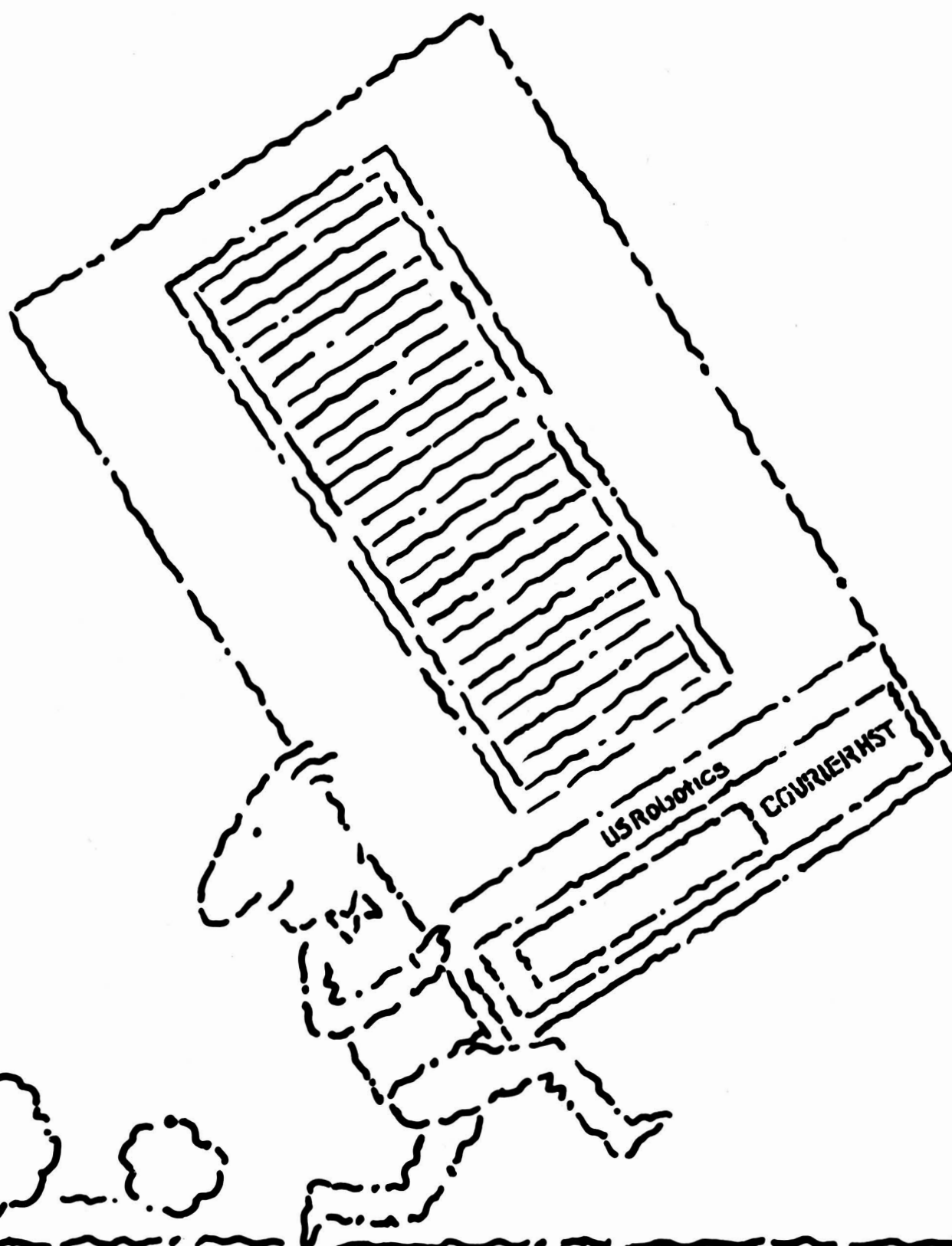
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their usual forms, or as numeric codes. For example, ESC D would mean the “escape” character, followed by a “D”—not to be confused with the hexadecimal equivalent of decimal 13, which generally appears as 0D. Also note that “D” and “d” are usually not equivalent in printer commands. The mixed notation can be especially confusing in com-

mand sequences containing numbers for part of the control sequence. For example, the command to turn on “correspondence quality” mode on many Oki-data printers is ESC 1. Only from the decimal and hexadecimal equivalents can you determine that you should use the character “1”, not the character whose ASCII code is 1. In some cases, there is

no way to be sure which of these alternatives is intended, and you’ll have to try both and see which one works.

Some special print modes are turned off automatically at the end of a line of text, when the printer receives a carriage return and line feed. Many others are initiated by one control code sequence, and turned off by another. For example, double-strike printing on the Epson FX series of printers is initiated with ESC G and cancelled with ESC H. Certain print elements for NEC letter quality printers contain up to 34 extra characters in addition to the usual 94 keyboard characters. This “alternate” character set is accessed by sending a CONTROL-N to the printer; CONTROL-O returns to the printing of the standard characters.

The way the code sequences must be expressed for the word processor installation program may or may not match the notation in the printer manual—or any of the standards described above. In the WordPerfect PRINTER program, for example, you enter non-printable characters by placing the decimal ASCII codes within angle brackets—<15> for “Control-O”—and Microsoft Word in some cases requires that the ASCII codes be expressed in octal (base 8!).

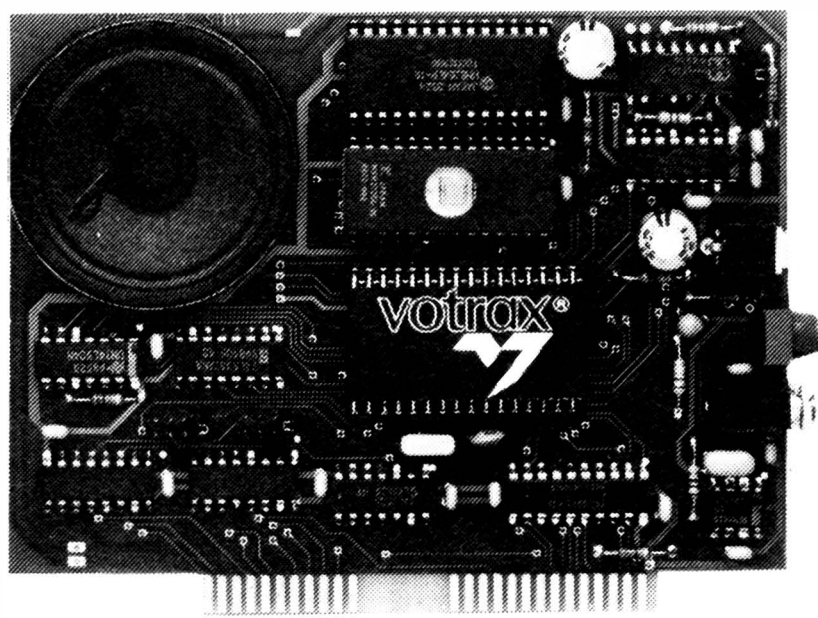
Some word processors, including WordPerfect, MultiMate, and Volkswriter, contain menu-driven printer installation utilities that construct a new printer driver based on the answers you give to a series of questions about your printer. While the sequence and wording of the questions will vary, most installation customizing programs will ask the same types of questions.

The most basic questions involve global aspects of the printer’s behavior: Does it recognize a “form feed” command to move to the top of the next sheet of paper or must the software send the correct number of individual line feeds instead? Does it require a line feed after each carriage return or supply its own? Can it perform a return and line feed separately? Can it backspace? Can it roll the paper back to the previous line? The answers to these questions are often considered too elementary to be stated explicitly in the printer manual, but you can usually deduce them from the command list—if it includes a code to perform a “negative line feed,” you can assume that the answer to the vertical backspace question is “yes.”

Also, the consequences of answering

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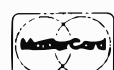
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these questions wrong are very predictable—instructing the program to add a line feed where none is needed will yield double-spaced printouts, while failing to provide a required line feed will result in the entire document being printed on one line. If a printer can't recognize form feeds, it will print over the perforations on continuous paper instead of paginating your document.

Just arriving at the right combination of these few simple options can take a moderate amount of experimentation for a novice trying to decipher a poorly written printer manual. A few procedural guidelines will help immeasurably. First, make a copy of a driver for a printer as similar to yours as possible and modify it, rather than constructing a new driver from scratch. Second, study a few existing drivers, preferably for similar printers, to solidify your understanding of the command structure. Third, when you begin to experiment, make just a few—one or two—changes at a time and evaluate the effects by printing a test document before you go on. This way, if you get a garbled printout, you'll be able to isolate the offending command sequence.

The more sophisticated print enhancements will require a better understanding of how printers work in general and of your printer in particular. The manual will usually not address methods of printing that are irrelevant to the printer at hand; you may have to infer the answers to questions about which method to use by searching for commands to carry out each.

The easiest parts of the definition process involve print enhancements that are activated and deactivated with single code sequences. For example, on many dot matrix printers, you can switch typestyles or sizes, or turn on a built-in italic mode with an escape sequence, and turn it off with another to return to the previous print mode.

Installing a seemingly simple feature, like boldfacing, may be confusing, because this feature can be implemented in quite a few different ways. Many daisywheel and dot matrix printers have an automatic boldfacing mode that is turned on and off much like the italic mode described above, with control codes or escape sequences.

A printer may offer both a double-strike mode, in which each character is printed two or more times, usually in exactly the same position but sometimes slightly below, and an “empha-

sized” or “shadow” mode, in which the print head moves forward a fraction of an inch before reprinting the character. You'll have to try both to see which yields a more pleasing result.

Printers that cannot advance the print head in small enough increments must boldface by striking each character repeatedly in the same position, and you may be offered the choice of how many strikes you want. Furthermore, there is more than one way to carry out this operation. Some printers can reprint a character several times without advancing the print head, while others strike each character, backspace, and restrike it. Printers that can't backspace must issue a carriage return with no line feed and make another pass across the entire line, restriking only the selected characters.

On typesetting machines and laser printers, boldfacing is implemented not as an enhancement that can be applied to any typeface, but rather as a completely separate font. Turning off boldfacing is accomplished by switching back to the font previously in effect, which with some programs (such as WordPerfect) requires that you include a special command to “remember” the current font setting in the “turn bold on” command sequence.

Entering the commands to switch character size and spacing is often a lot more complicated. With many dot matrix printers, only a finite number of horizontal spacing (pitch) values are permitted—for example, 10, 12, and 15 cpi—and each is associated with a specific type size. But the relationship is not always immutable. You may be able to select 10 or 12 cpi for a particular near-letter quality font, with the characters appearing slightly more crowded, but not unacceptably so, at 12 cpi.

Most daisywheel printers can “microspace,” which means that the mechanism can move the print head in very small increments—1/120 inch horizontally and 1/48, 1/72, or even 1/216 inch vertically. You can set the horizontal or vertical spacing as a multiple of these units, independent of the character size, which is of course determined by the print wheel. Printing at 10 characters per inch with a print wheel designed for 12 cpi (a very common mistake) simply results in widely spaced text, and you can easily print at 18 cpi with a print wheel designed for 15.

To install such a printer that can microspace (this class does include

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TIPS

some dot matrix as well as daisywheel printers), you must specify the smallest units of horizontal and vertical motion and the commands used to set the horizontal and vertical spacing. The actual units used by the program may be the same as the physical increments of print head motion, or a more arbitrary unit. For example, you might enter the "horizontal motion increment" as 1/120 inch, and then provide the command to set the horizontal spacing to a particular value, expressed in 1/120 inch. Microsoft Word, on the other hand, uses "twips" for most printers; a twip is 1/1440 inch (note that 1440 is evenly divisible by 48, 72, and 120, which facilitates easy conversion to the printer's physical unit). For laser printers, it uses units of 1/300 inch, to match the resolution of these printers.

With some printers, in particular dot matrix printers, the character size is more closely related to the pitch—selecting "compressed" print, for example, changes both the size of the characters and the horizontal pitch (typically yielding between 15 and 17.5 cpi). Most programs handle these selections as font changes, rather than as horizontal pitch changes.

For proportionally spaced fonts, there is even more work to be done. You must specify the width of each character, generally in the standard unit used for horizontal motion—1/120 inch—or in twips. This information is contained in a "character width table" or "spacing table" that allows the printer to advance exactly the right number of increments after striking each character to produce the desired spacing.

In addition, if you need to print characters that are not part of the normal printable character set, you must define the commands for producing these characters. This may involve combining two characters—for example, to produce an accented "a" on a daisywheel printer, you might have to print an "a", backspace, and then print the accent mark. For more esoteric symbols, you might have to issue the command to switch to an "alternate" character set, print some character, which may not resemble the symbol itself, and then return to the standard character set. On a laser printer, you might have to switch font cartridges to access characters not present in the font you normally use.

Some programs, such as WordPerfect, combine this "character table" with the spacing table that specifies the

character widths; with Microsoft Word, you must enter two separate tables; and Volkswriter 3 uses a file that is completely separate from the printer description file to establish the correspondence between characters as they are displayed on-screen and are printed.

Sometimes the most powerful and flexible programs are the hardest to set up, especially when combined with a less-than-user-friendly installation procedure. As virtually all the configuration programs warn you, editing the printer drivers requires a degree of sophistication from the user, and some, in particular Microsoft Word, almost assume you are a programmer.

The procedure used by Word is of a different sort than the menu-driven question-and-answer techniques of programs such as WordPerfect or Volkswriter 3. Word offers instead a utility called MAKEPRD.EXE, which converts a .PRD file to a "standard" (standard only to Word) text file format, or vice versa. While you can create a text file from scratch and turn it into a .PRD file, typically you would convert an existing .PRD file to a text file, edit the text file, and then convert the result back to a .PRD file.

The format of the file reflects the flexibility offered by Word to customize the program for almost any type of output device. The file format consists of keywords, each of which represents a printer feature or function, followed by a code representing the feature (for example, PrinterType:5 denotes a laser printer) or the command sequence required to implement the function. After a header section describing the printer in general, a section follows that describes each font, and within each font, each type size. To create nonstandard characters, you can include a "character translation table" and for proportional fonts, a "character width table."

Some of these procedures are intimidating enough to induce you to buy only a popular printer that is sure to be supported by most software, or one that closely emulates such a printer. While it is true that constructing a printer driver from scratch is a formidable task, making a few changes to optimize, personalize, or enhance an existing driver is a perfectly realistic goal. You may find that the time you spend learning and experimenting (and often, cursing) pays off handsomely in an enormously improved understanding and appreciation of the inner workings of your computer, printer, and word processor. ■

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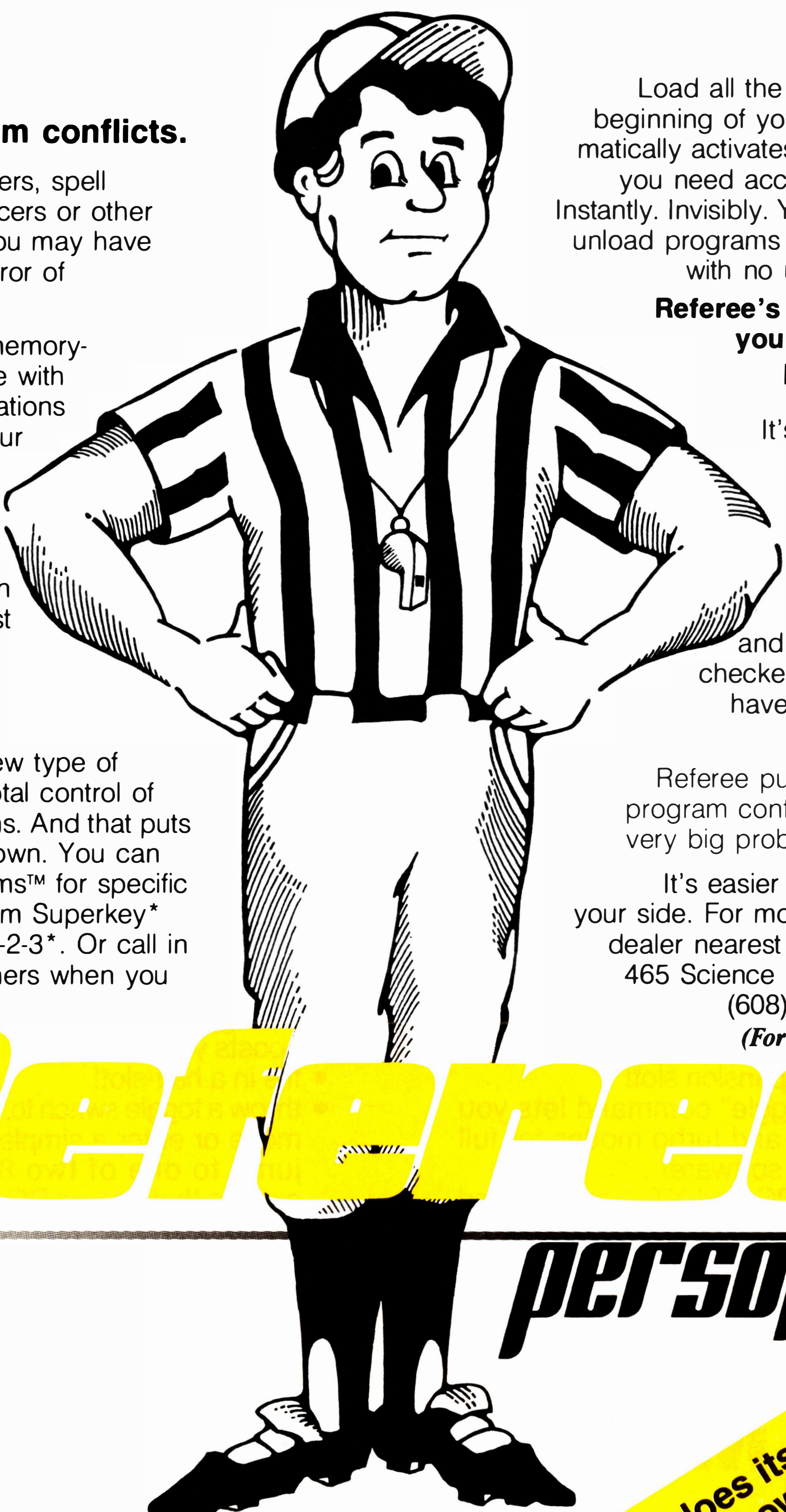
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(For More Information Circle 45)



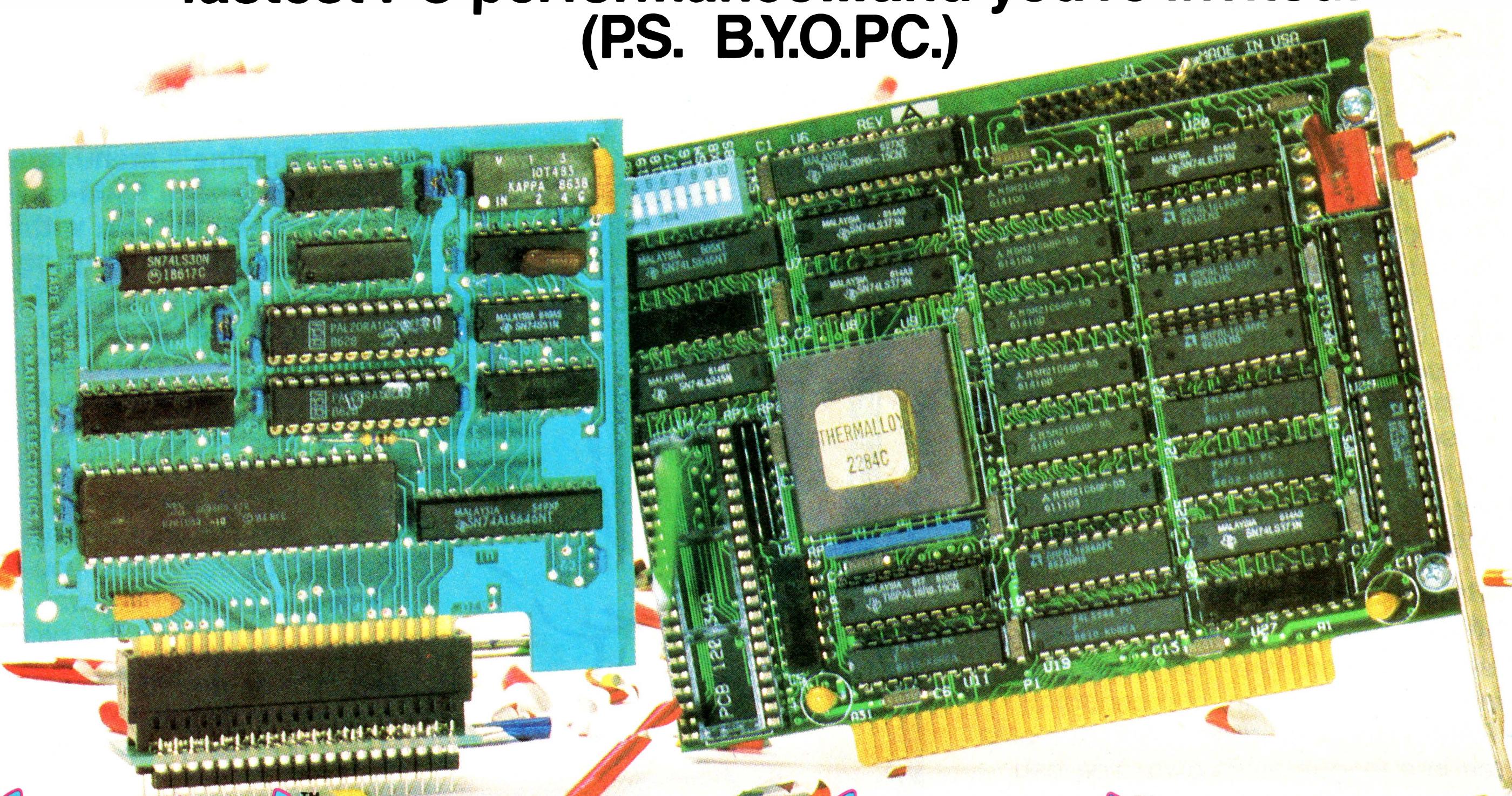
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PRODUCT REVIEWS

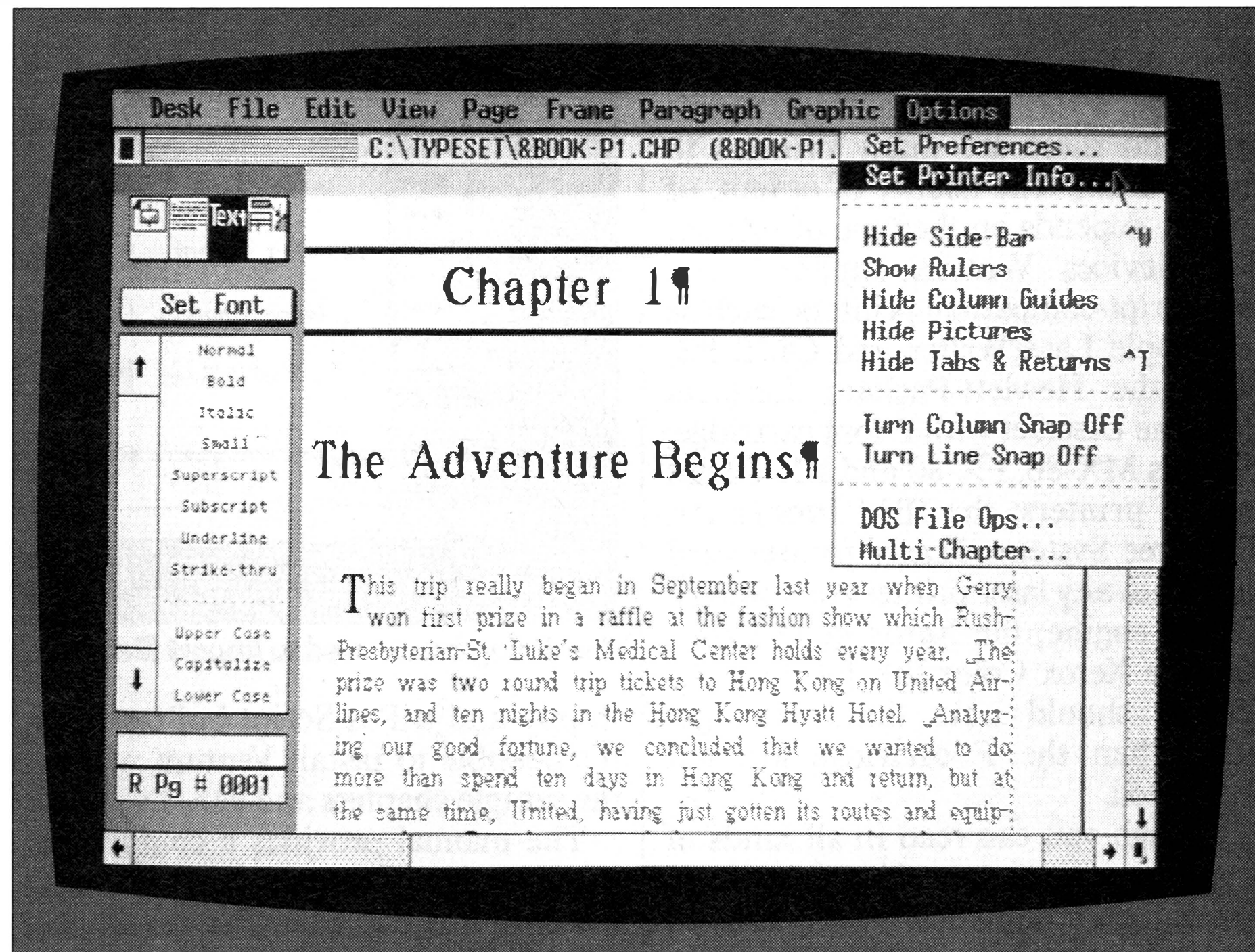
A critical look at the latest computer hardware and software.

Putting It All Together With Ventura Publisher

VENTURA PUBLISHER is a desktop publishing program for the IBM XT, AT, or compatibles; it requires at least 512k (640k is recommended when creating chapters of more than 20 pages), a graphics adapter, and a mouse; the program's 11 disks are non-copy-protected; \$895 retail, Xerox Corp., Business Systems Group, Post Office Box 117513, Carrollton, TX 75011-9990; (800) 822-8221. (For more information, circle 257 on the Free Information Card.)

Before there was desktop publishing, there was word processing. The developers of Ventura Publisher, recognizing that most users feel more comfortable doing text entry and revisions in their favorite word processor, made Ventura very accommodating to those users. This sprawling program's most valuable unsung feature may actually be its ability to import and export files to WordPerfect, MultiMate, WordStar, Word, and ASCII with print enhancements (such as underlining and boldfacing) intact. The formatting of margins, headers and footers, columns, font changes, and text merged with graphics is accomplished through style sheets available in Ventura. Print enhancements such as boldfacing and underlining can be created either in your word processor or in Ventura.

So, for example, WordStar's Ctrl-PS codes translate to underlining in Ventura, and underlining done in Ventura will translate back to Ctrl-PS if you decide to go back to WordStar to do some heavy editing. Ventura has a limited word processor built in (search and replace are not available, for example, but you can readily make insertions, delete characters, or cut and paste text). The one thing that may take getting used to while in edit mode, though, is that you are looking at a graphics-based word processor. Characters are proportionally processed as you type: As you add characters, the other characters on the



Pull-down menus, scroll bars, and real-size headlines are some of Ventura's features.

line crowd together; as you delete, they spread out. There are dramatic differences on the screen between the i's and w's, not something you see with the monospacing of a character-based word processor. Surprisingly, though, the speed at which Ventura reforms lines is barely a beat behind that of most word processors.

Even if a particular word processor isn't listed in the dialog box for loading a file, Ventura recognizes ASCII characters (letters and numbers without control codes or graphics). You can save your file as ASCII in most word processors, then insert the formatting when you load the file into Ventura. Ventura also recognizes certain ASCII character groups as formatting commands; for example, signifies that text to follow is to be boldfaced and <u> signifies underlined. The symbol <d> returns text to its default typeface. So, if your word processor is not supported by Ventura, before you convert to ASCII, you might want to search and replace that program's normal codes with the ones that will be recognized by Ventura. (Release 1.1, due at the end of March, will recognize DisplayWrite and XyWrite formats and address DDL and In-

terpress, page description languages.)

Even without taking advantage of its fancy formatting features, you could use Ventura as a word processing conversion program. You could, for example, import a MultiMate file and export it as a WordPerfect file. Keep in mind, however, that there are much less expensive utility programs that do this already, and Ventura's real value resides in its ability to lay out multiple pages, quickly reform text when changes are made, and drive a battery of expensive laser printers.

I had turned off hyphenation and justification as defaults in my own word processor years ago, because hyphenation decisions slow down formatting, and the page didn't look all that much better with the nonproportional daisy-wheel available. Thus, there was a certain thrill watching Ventura import a document and flash the message "hyphenating" on the screen. A three-page memo written in WordStar took approximately 30 seconds to hyphenate and adjust to the designated Ventura style sheet. Characters were proportionally spaced across the page, and the right margin was justified and properly hyphenated. It looked typeset.

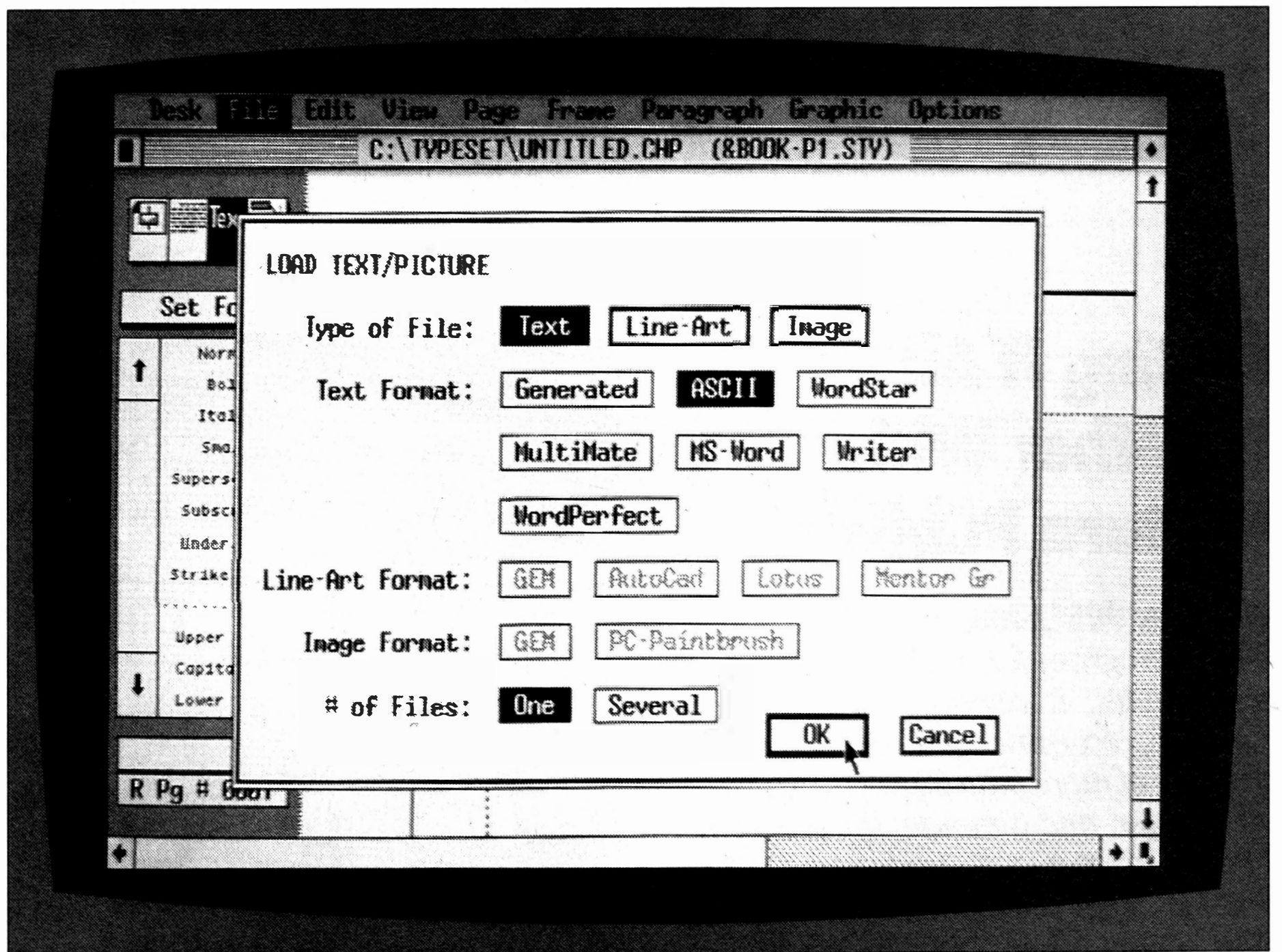
PRODUCT REVIEWS

Since Ventura includes many style templates, you can pick from designs meant for invoice forms, magazines, newsletters, books, technical manuals, letters, or reports—or even design one to your own liking. A style sheet is saved separately and can be applied to any new file you might load in the future.

Even before all the elements are right on the screen, it's tempting to print out. And there are many printers to choose from. The quality of output, of course, depends on the type of printer. The devices Ventura supports are: PostScript-compatible printers (such as the Apple LaserWriter and QMS PS-800); the Hewlett-Packard LaserJet Plus; the LaserJet with F font cartridge; Epson's MX-80, FX-80 and RX-80 dot matrix printers; the IBM Proprinter; Tall Tree Systems J Laser printer card used with any laser printer containing a Canon engine; the Xerox 4045 Laser; and the Xerox Color Ink Jet. LaserJet owners should note that cartridges other than the F cartridge are not supported.

Though you can read in all kinds of graphics and picture files (and have words then automatically wrap around them), Ventura does not capture images from a scanner. We had to first install Z-Soft's PC PaintBrush, for example, to capture images from a Canon scanner and store them as picture files before bringing them into Ventura. Lotus 1-2-3 graphs can be imported.

Ventura's installation can easily take an hour. (Add more time if you first need to install a mouse.) Though you won't have to study the manual to install the program, the 11 disks have to be swapped in and out of your floppy drive according to the menu choices for copying to the hard disk. Then, if you have opted for four different printer drivers as we did (PostScript, J Laser, LaserJet Plus, and the Xerox 4045), you'll sit and twiddle your thumbs for half an hour while your hard disk's drive light goes on and off and the message on the screen says "Expanding Fonts." Fonts are stored on the program's floppies in compressed form, and they must be decoded before your computer can use them. By the time installation was done, about 3Mb of an IBM AT's hard disk was filled. Typically, though, one laser printer and perhaps a dot matrix printer will suffice, shortening installation time and using up less hard disk space. This is not a program for a dual-floppy system, though with a 1.2Mb



The dialog box is used to import files from word processors and graphics programs.

floppy and a PostScript-built printer, it's possible to install Ventura without the sample chapters and run it.

The manual provides a comprehensive overview of the program's powerful features. It is also a tangible example of what Ventura can do: Its several hundred pages (most of which are illustrated with screen menus and dialog boxes) were formatted, laid out, indexed, and printed using Ventura. Decked out with headlines, subheads, borders, italics, and pointing hands, it is profusely illustrated with the program's Macintosh-inspired screens. (A run-time version of GEM, Digital Research Inc.'s graphics-based operating environment, is built into Ventura. A different version of Ventura is expected later this year that will work with Windows, the Microsoft operating environment.)

Anyone familiar with the Macintosh should have no trouble using Ventura, although for people who work only with a keyboard, the relation between the mouse on your desk and what's happening on the screen does take getting used to. For such mouse novices, menus may pull down when you don't want them to, and certain commands won't be operational until you have first clicked on a different mode on the side panel. With practice, though, mouse maneuvering becomes second nature. And the mouse is useful when placing or scaling pictures.

Ventura, at \$895, is \$200 more than other popular desktop publishing pro-

grams for IBM compatibles, including PC PageMaker from Aldus, FrontPage from Studio Software, and Harvard Professional Publisher from Software Publishing Corp. The real choice, however, may come down to a decision between any MS-DOS-based desktop publishing system and the Apple Macintosh with the LaserWriter. In two years, the Mac-based system has developed a well-deserved niche as a dedicated publishing unit. It doesn't require you to fuss with making CONFIG.SYS files or installing a mouse. And one advantage we think the MS-DOS world offers, color, is only partially supported with Ventura. Though we were using an EGA display, Ventura only shows the inferior CGA-level resolution. We chose to run the program in monochrome instead.

Choosing Ventura over a Mac-based system is a decision based upon where your company is coming from as well as where it is headed. Word processing files from the IBM world can be transferred into Ventura from the same computer; with the Mac they would have to be transferred via a communications link, or a special board and software installed in an IBM compatible to process MS-DOS files. However, if such a link already exists, or if there's no problem working in a dedicated Mac environment, it's hard to ignore the well-integrated solution that the Mac offers. Nevertheless, Ventura makes a strong case for doing desktop publishing in an IBM compatible world.

—Michael Antonoff



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(For More Information Circle 57)

Departmental Laser

TEXAS INSTRUMENTS OMNILASER 2015

is a laser printer designed for moderately high volume output. It comes with two paper bins, resident Courier type in three sizes, two cartridge slots for extra fonts as well as printer emulation, 16-line LCD display, and 512k RAM; \$5,995 retail; Texas Instruments, Inc., Data Systems Group, PO Box 809063, H-860, Dallas, TX 75080-9063; (800) 527-3500. (For more information, circle 262 on the Free Information card.)

The first desktop laser printers were so well received by users that many people overlooked the fact that those machines really weren't designed for volume production—they could handle a modest few thousand pages per month and turn out an estimated total of 100,000 copies before parts of the mechanism had to be replaced. At first, no one was counting. But as interest continued to grow—spurred on by the emerging field of desktop publishing—it became clear that sharing lasers was the way to go, to limit costs. Unfortunately, such use pushed the units beyond their design limits.

The situation was made to order for the development of new products, and Texas Instruments is one of the first into the breach with the OmniLaser 2015. The unit prints up to 15 pages per

minute (ppm), nearly twice as fast as the 8-ppm Apple LaserWriter or Hewlett-Packard LaserJet. Just as important, it is designed to handle up to 25,000 pages per month for a total output of 1.5 million copies over its expected life span.

At the core of the product is the Ricoh laser print engine, a product that significantly improves on the Canon engine used in the LaserWriter and LaserJet, among others (though Canon has now redesigned its own laser engine).

Another feature that is deficient in many lasers is paper handling. Because of their fairly high cost, laser printers are a natural for the so-called shared resource environment, where several people share a single peripheral. Such an arrangement often produces lots of paper, sometimes prodigious amounts. The OmniLaser has two paper trays, which can be either standard or legal size. The trays, which hold 250 sheets each, can be selected from the printer's front panel. In addition, the OmniLaser ejects copies face down so that numbered pages stack up in order.

The panel itself has a 16-character display that shows information on the printer—available fonts, printer emulation selected, and ready status. There are also nine symbols above the LCD to provide additional information. The touch-sensitive keys on the panel control the printer options. The panel is well designed, providing more informa-

tion and control than most laser printers. The lighted symbols, however, would be more useful with the addition of a printed description, perhaps available on a pullout card. They are defined in the manual, but since several of the symbols look similar, it's hard to avoid thumbing through the manual repeatedly. We taped a copy of the appropriate page in the manual to the printer.

The dip switches are at the back of the printer next to the parallel and serial ports. Switches are often a sore point for printer users. At first, the OmniLaser switches, too, seemed intimidating. There are twelve of them on the back of the unit, plus four internal ones. Then we discovered that invoking "test" on the front panel prints out a complete rundown of the switches, including a description of the currently selected switch options. This test sheet—which also shows resident fonts and printer emulations—plus available RAM and tray size, is a real timesaver. It alerted us to the fact that we had incorrectly selected the serial port rather than the parallel one.

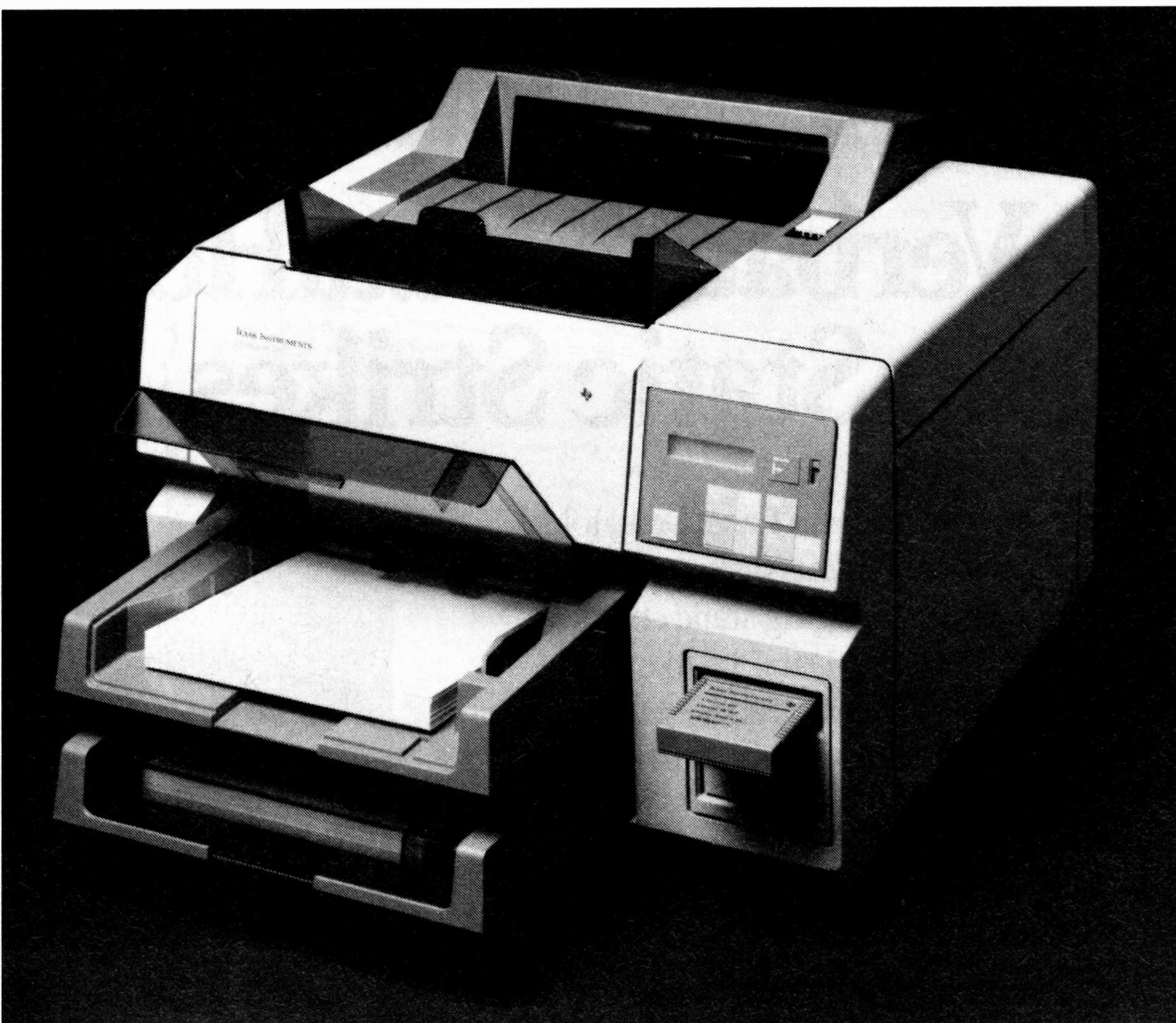
These features don't come cheaply. The OmniLaser retails for \$5,995. At this price, the machine is definitely for the business environment, and Texas Instruments plans to sell it primarily through retailers specializing in corporate sales or directly to data processing departments within large companies.

Texas Instruments offers two other machines with better graphics capability. The top-of-the-line 2115 has all the features of the 2015 plus more memory and PostScript, the page description language, for \$7,995. The 2108 also has PostScript but only one paper tray, and a lower-volume 8-ppm laser engine for \$5,995. The 2015, by contrast, is intended for a high-volume word processing environment requiring only limited graphics (like bar and pie charts).

Advanced graphics may not be required by a given department when it purchases a laser, though they may be later. Unfortunately, the 2015 has no provision for either memory upgrade or the addition of PostScript, a serious design limitation. Representatives of TI did say that might be available in the future. Until then, the 2015 printer is an excellent choice for high-volume word processing, but only if there is little need for extensive graphics or font selection.

—John Blackford

(More reviews page 147)



The OmniLaser 2015's two 250-sheet input bins enhance paper handling.

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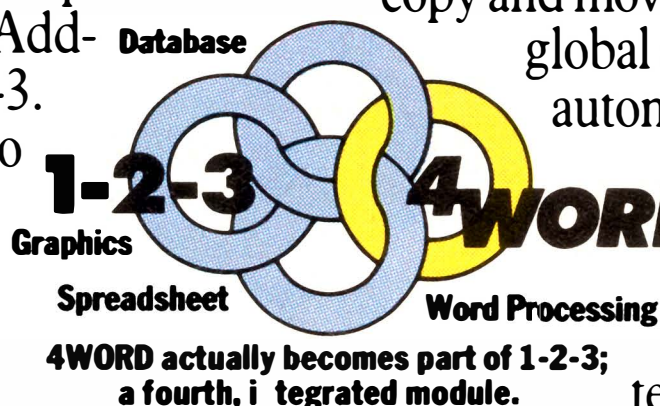
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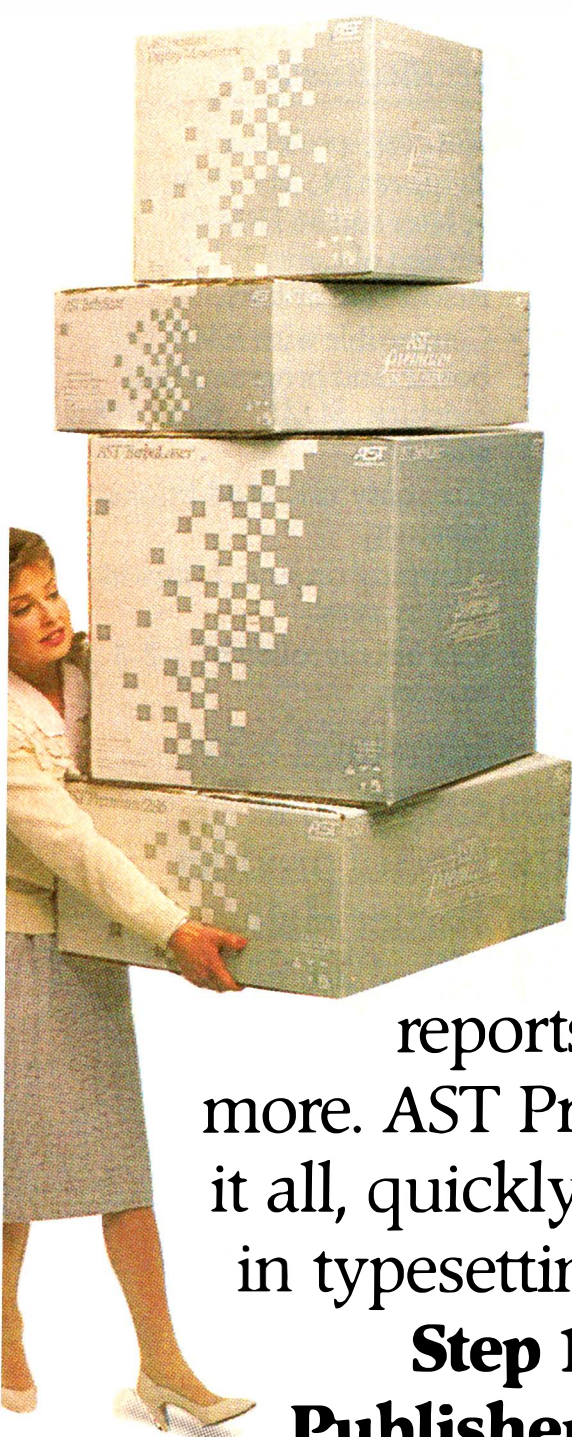
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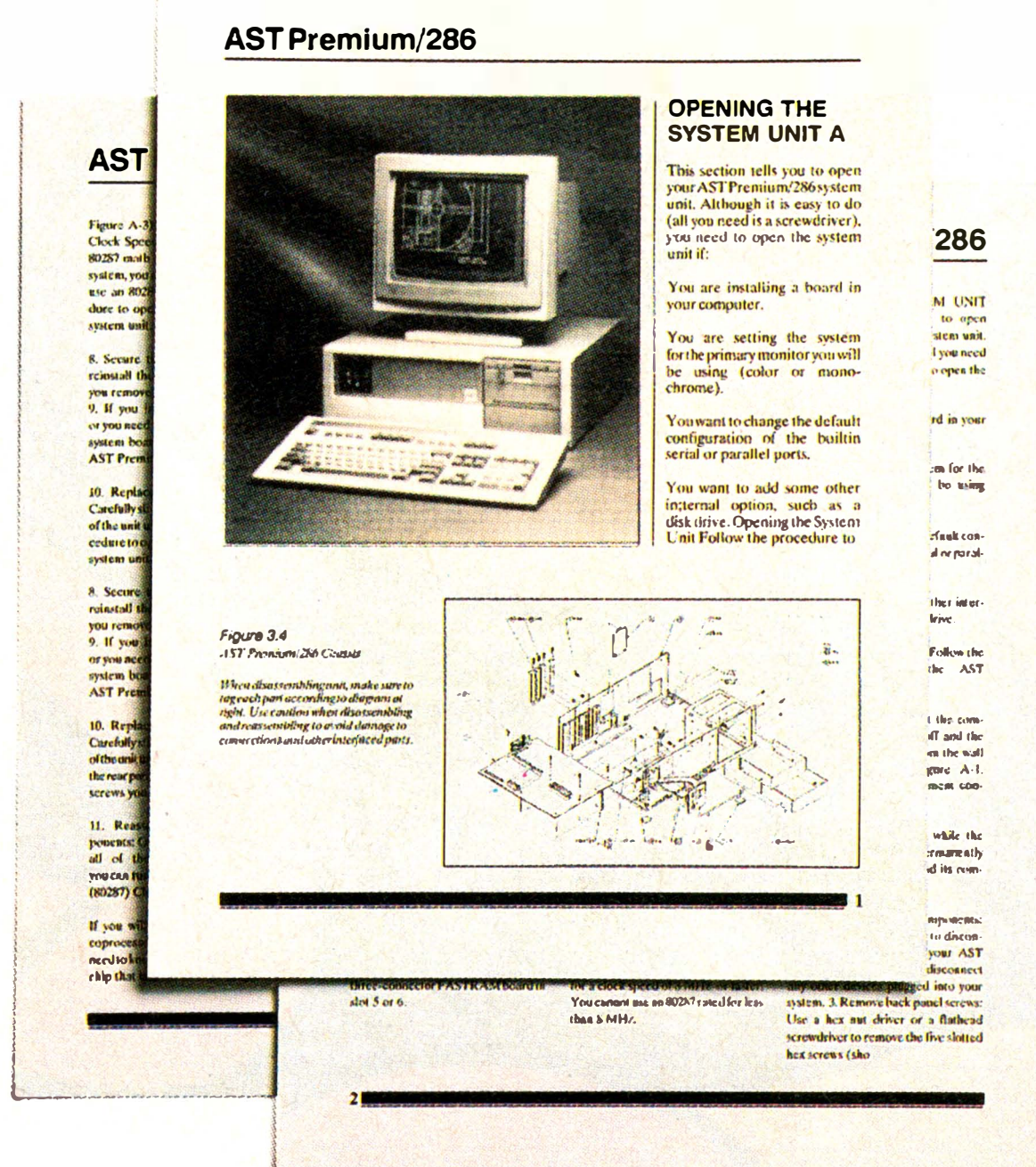
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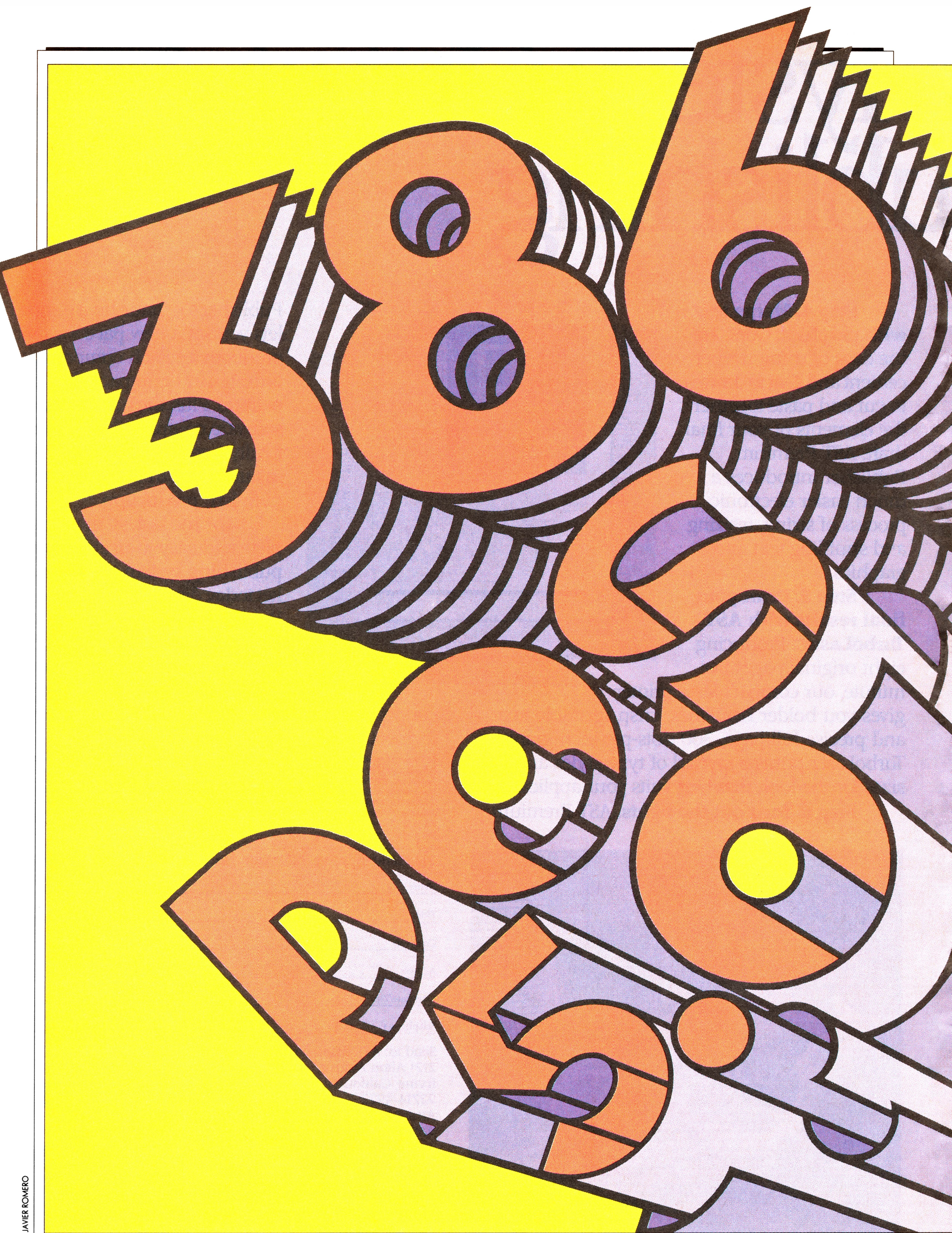
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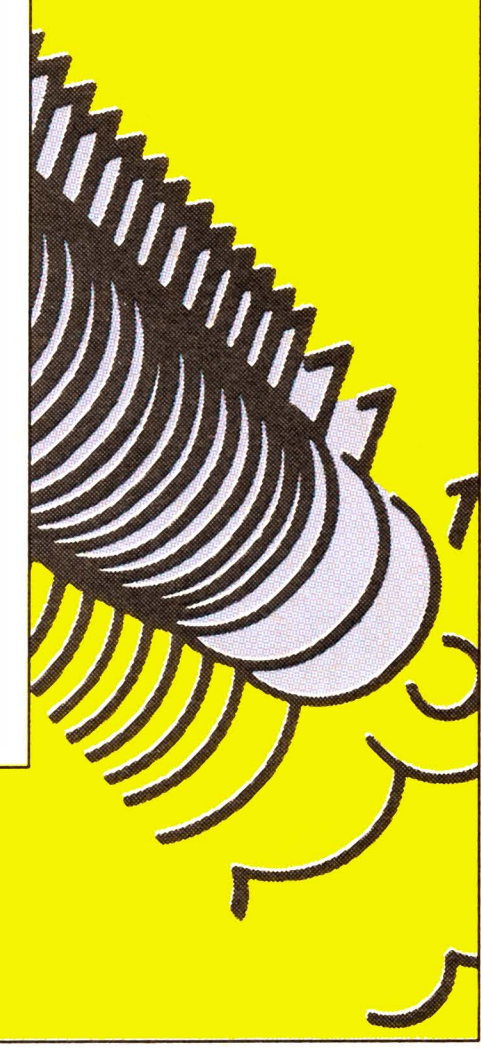


HARD QUESTIONS AND NOT-SO-EASY ANSWERS

by Sandra R. Reed and Patrick Honan

Good things in computing come to those who wait. And wait, and wait.

Proof of that is the 80386 processor and the new version of MS-DOS expected later this year. The processor contains more computing power than any processor before it. But nearly six months after the introduction of the first computer to use the processor—the Compaq Deskpro 386—that pow-

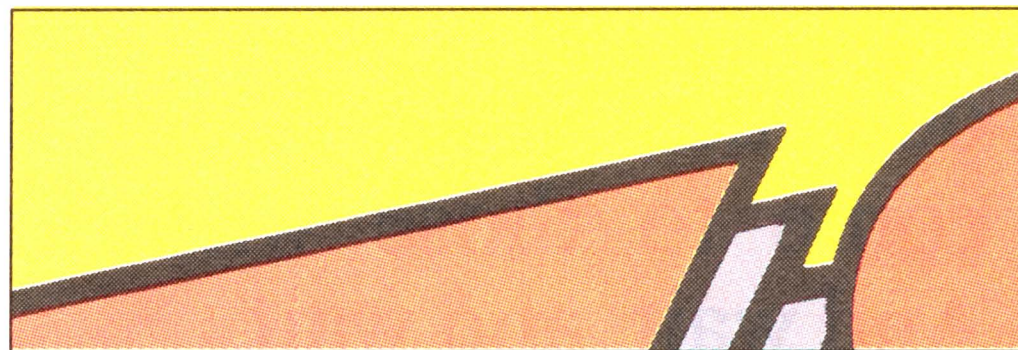


THE 386 CHIP HAS A VIRTUAL- 86 MODE THAT RUNS MULTIPLE 8086/8088 PROGRAMS, WITH EACH PROGRAM SUBJECT TO THE 640k LIMIT.

er has yet to be fully used. The new MS-DOS version will make only 16Mb of RAM available to users for applications. No one knows when a DOS will be available to take advantage of the even greater abilities of the 386 processor. Those using the current MS-DOS gain faster operation but nothing more, although the latest DOS operating environments do tap some of the 386's power.

As is typical in the computer industry, glowing reports about a new product category have stimulated interest that won't be satisfied for some time. The 386-super may be shipping, but the DOS for it could be a couple of years away. In addition, the diverging interests of the various manufacturers involved have led to statements that don't always clarify the issues for potential users of the new systems. Some of them are trying to trumpet some feature they plan to offer, while others want to minimize discussion until they have a product ready to ship.

The many statements, counterstatements, and promises concerning the benefits of the 80386 processor and new DOS have caused some confusion. In fact, the experts themselves don't always agree—at least it often sounds as if they don't. Part of the reason is the complexity of the subject; part is the obscure lingo that has sprung up to describe concepts like protected mode, direct addressing limits, virtual DOS sessions, and others seemingly pulled from the pages of a textbook on quantum mechanics. Here, then, are hard questions and not-so-easy answers about the 386 processor and the new DOS.



How does Intel's 80386 chip differ from the 8086/8088 chips used in the IBM PC and compatibles and from the 80286 used in AT-level computers?

It is faster and considerably more powerful. The 80386 chip is Intel's first 32-bit microprocessor, which means it handles information 32 bits (binary digits) at a time and communicates with hardware, like add-on cards, at 32 bits also. The 8088, which IBM uses in its PC and XT, processes data 16 bits at a time but communicates with hardware, like add-on cards, only 8 bits at a time. The 80286 chip both processes data and communicates with hardware 16 bits at a time.

Another factor contributing to the 80386 chip's faster speed is its higher clock speed. A computer's clock speed is the rate at which it processes bits of data. An 80386-based computer operating at 16MHz, for example, processes the 32-bit chunks of information at an internal clock cycle of 16 million times per

second. The present 80386 chip can be run at 12, 16, or even 20MHz, and a version reliable up to 24MHz is on the horizon. The 80286 chip functions at clock speeds between 6 and 16MHz, but most manufacturers of 80286 computers design them to run at either 6 or 8MHz. The 8088 chip typically runs at 4.77MHz, though 8MHz turbo options are becoming common. Many makers of PC compatibles use the 8086 chip because it runs as fast as 10MHz and, more important, is a full 16-bit CPU. An 80386-based computer operating at 16MHz is handling twice as much data as an IBM PC AT (32 bits versus 16 bits) and processing it twice as fast (16MHz versus 8MHz).

In addition to faster communication and clock speeds, there are differences in the ability of the chips (8086/88, 80286, and 80386) to address random-access memory (RAM). The 8086 and 8088 are capable of directly addressing 1 megabyte of RAM, while the 80286 can address 16 megabytes and the 80386 4 gigabytes. For reference, one byte is 8 bits, one kilobyte is 1024 bytes, one megabyte is 1024 kilobytes (a million bytes), and one gigabyte is 1024 megabytes (a billion bytes). However, until there is a new operating system, memory access beyond 1Mb cannot be exploited. Current versions of PC-DOS and MS-DOS can't directly use more than 640 kilobytes of RAM. (The remainder of the megabyte of RAM available to the 8086/88 is reserved for internal DOS functions.)

All of the 80xxx series chips beyond the 8086/88 contain downwardly compatible modes of operation, which means the 386 can run programs written for it, or for the 286, or for the 8086/88.



What are the various modes of operation of the 286 and 386 chips, and what do they mean?

The 286 can simultaneously run in two modes, real and protected. In real mode, it runs 8086/88 programs just like those processors run them, one at a time and subject to the 640k memory limit. In protected mode, the 286 chip can run multiple 286-specific programs. Although the 286 chip has been available for more than three years, the protected mode hasn't been exploited in the MS-DOS world because DOS is not yet capable of using it. Multiuser operating systems such as the Unix system are available and can take advantage of the multitasking and added memory capabilities of the protected mode (although, it's quite obvious, there is nowhere near as much software available for them as

there is for MS- or PC- DOS).

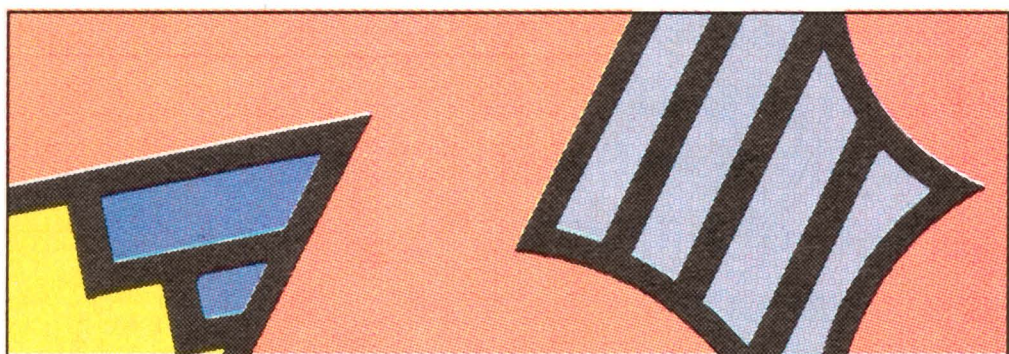
The 386 chip is actually a superset of the 286 with added capabilities. Its real mode performs just like the real mode in the 286. It also has what is called a virtual-86 mode, able to run multiple 8086/88-generation programs. And it has a protected mode, which serves the same functions as the 286's protected mode. Each of the virtual 8086/88 sessions is subject to the 640k limit. But again, these capabilities are not available to DOS 2.0 or 3.0. However, some software developers, like Quarterdeck with its Desqview, have created operating environments that tap the 386's virtual (but not protected) mode. The 386 is also capable of simultaneously running multiple 286-protected mode programs and multiple 386-generation programs—but only with a multiuser operating system such as Unix, or with new versions of DOS when they are available.



What is DOS 5.0?

It is the operating system, expected sometime this year from Microsoft, that will take advantage of the protected mode of 80286-based computers. In addition to being called DOS 5.0, it is often known as 286DOS, or more often, ADOS (Advanced DOS).

The 286 running ADOS can address 16Mb of RAM, in contrast to the 1Mb (640k available to RAM) the 8086 and 8088 processors address running current DOS versions like 2.0 or 3.0. But the 286 running such versions is subject to the same 640k limitation as an 8088 CPU. Only with ADOS will the advanced modes built into the 286 chip become available—and then only when new applications are written specifically for the new DOS to take advantage of the extra memory available and the so-called protected mode, which allows multitasking. It is also expected that the new DOS (ADOS) will remove the current 32Mb limit to hard disk size.



What's the status of the ADOS operating system? When will we see it?

Microsoft says it will release a new DOS in 1987, but exactly when is not clear. Preliminary (beta) copies have been in the hands of some software developers for as long as two years, but few people know exactly

386 BUYING SPREE

At the accounting firm of Coopers & Lybrand, the question isn't whether to buy 80386-based personal computers—the key issue is how many the company should buy.

The first shipment of Compaq Deskpro 386s arrived in time for use in the firm's tax preparation undertakings, that annual ritual that accountants (and taxpayers) love to hate. The computers were added to the buying lists at Coopers & Lybrand's more than 100 offices nationwide after extensive testing at the firm's office of Advanced Information Technology Planning (AITP) in Dallas, Texas. It took the 386s through their paces in an attempt to identify how Coopers & Lybrand and its customers might use the systems.

Dave Landry, a Dallas-based office automation expert, says the AITP group office identified three major applications categories in which 386-based machines excel: as network file servers, for programming the company's customized tax software, and in specialized applications.

Even though the Compaqs were added to the firm's approved buy list, Landry remains skeptical that a 386-based machine has a place on every desk. He estimates that during the next two or three years, 386-based systems will constitute less than 10 percent of the firm's PCs.

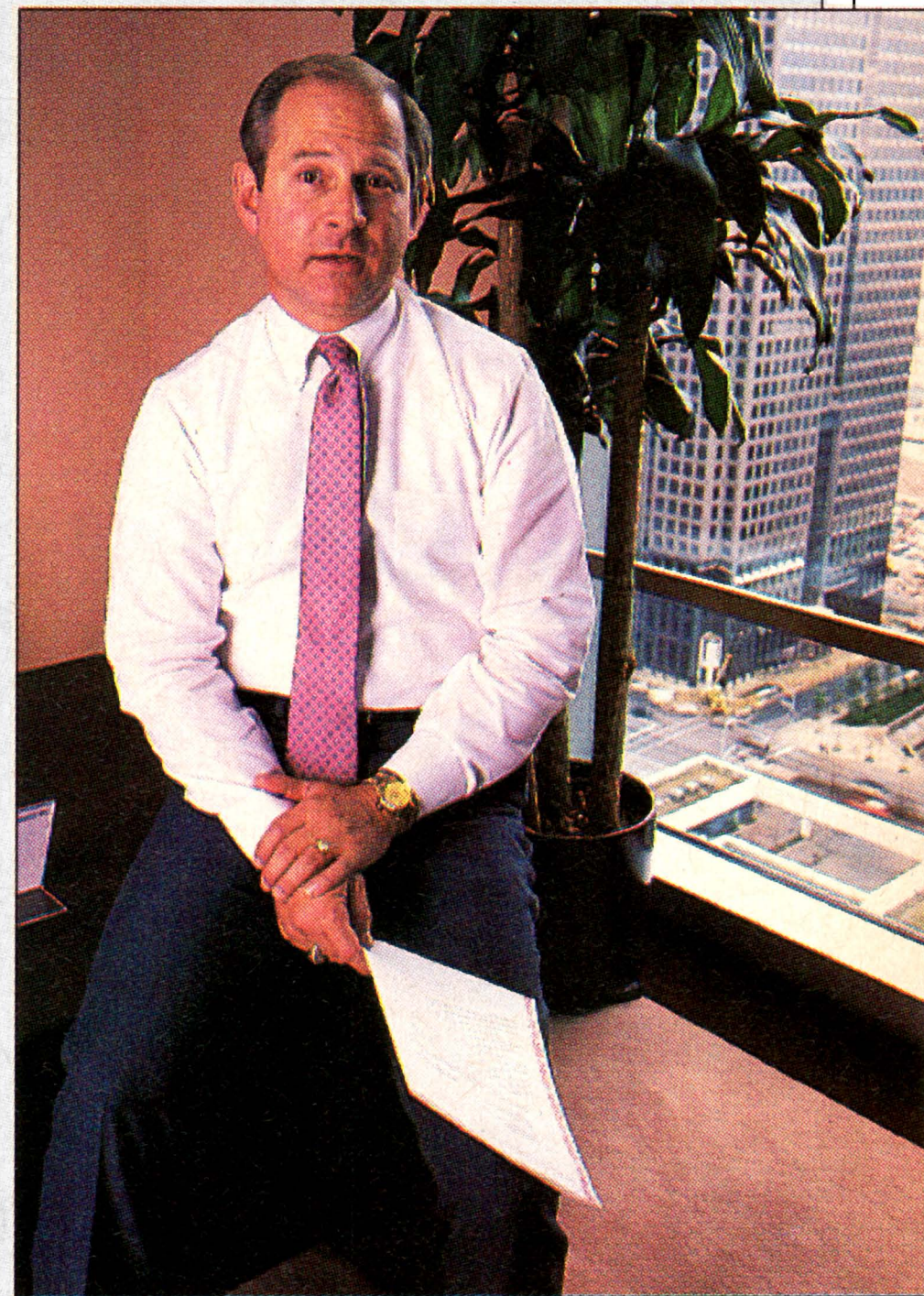
At present, Coopers & Lybrand owns several thousand personal computers, most of which use the IBM software architecture (MS/PC-DOS). Like many other companies, the accounting firm has begun to standardize on 80286-based machines that can run software written for the IBM PC AT, leaving 8088-based PC-compatibles to languish.

During the course of its assessment of the newest generation of hardware, Landry's office considered a number of factors, including speed and software compatibility with existing applications. Even though an advanced operating system was factored into the equation, it wasn't a major consideration, he says. Neither was speculation about the architecture of IBM's much-anticipated 386 machine.

Were it overly concerned with operating systems, in fact, Coopers & Lybrand wouldn't be migrating toward 80286 machines, since Microsoft has yet to release a DOS to take advantage of that chip's advanced capabilities. As Landry says: "We're two and a half years into AT hardware without the opportunity to exploit it." Even when a 286DOS is finally released, applications software that exploits its ability to address more RAM directly will continue to lag. The same lag no doubt will occur between the release of a 386 DOS and accompanying software.

Rather than worry about the future of operating systems, then, Coopers & Lybrand centers its concern on how a machine can be used *now*. "We don't concern ourselves with the fact that the 286 can theoretically do more [than 8088-based machines]," says Landry. "And if we can use 386 machines over the next two or three years, that's fine."

—S.R.R.



DAVE LANDRY: DOSes aside, what a new machine does right now is pivotal.

TIM BOOLE



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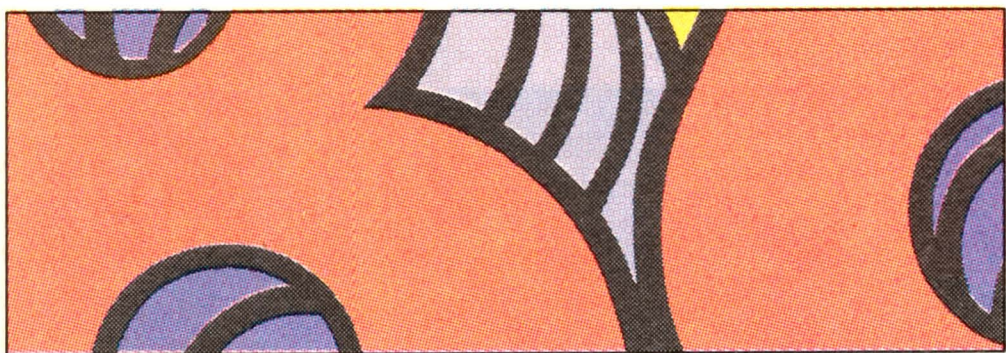
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(For More Information Circle 36)

what it will include. Because of the close relationship between Microsoft, who makes the operating system, and IBM, the new DOS won't be released until IBM approves, which it probably won't do until it has a new computer—perhaps an 80386 machine—to roll out at the same time. Most industry watchers believe ADOS will make its way to market sometime between March and October of this year. But until that time, all versions of Microsoft DOS currently available remain limited to the architecture of the 8086/88 chip for which they were designed. Though IBM might time the release of ADOS to coincide with that of its 386 computer, that operating system is actually designed around the 286 chip, not the 386. It's only because the development cycle of the operating systems is so slow that ADOS is significant to 386-based computers. A 386DOS is not likely to be available for a couple of years after 286DOS. So until then, DOS users will have to make do with ADOS.



What kinds of applications will we see for the new versions of DOS?

When ADOS—and eventually 386DOS—have been around long enough for new programs to work their way to the market, one thing we'll see is some powerful enhancements for individual users. There are already plenty of multiuser computer systems and operating systems around. The difference is that DOS has its roots in the needs of those using a *personal* computer. The raw power, memory addressing, and multiuser capabilities of both the 286 and 386 chips are likely to stimulate whole new categories of productivity tools for individuals—though all we can do now is speculate.

Some possibilities: advanced graphics and cut-and-paste features, allowing managers to produce typeset-quality reports with halftone photos and graphics added in—the next generation of desktop publishing; a complete dictionary and thesaurus on-line at all times, including definitions and tips on word usage; a massive Rolodex and phone dialer on-line; background on clients or industry sources available quickly, whether or not you know exactly what to ask for.

In addition, the 286/386 generation may see use in low-cost CAD/CAM and engineering workstations with the added benefit of MS-DOS compatibility. Artificial intelligence will develop in two directions: one toward stand-alone products, so-called expert systems, that offer diagnosis and suggestions on complex subjects; the other toward ad-

FULL SPEED AHEAD

Based solely on labor savings, Energy Simulation Specialists (ESS) in Tempe, Ariz., long ago recovered the additional cost of buying a Compaq Deskpro 386. Applications that required up to 16 hours to run on an 8MHz IBM PC AT run in three to four hours on the 386, says the company's president, Chuck Sherman. The 386 also is handling some tasks that were previously run on mainframes.

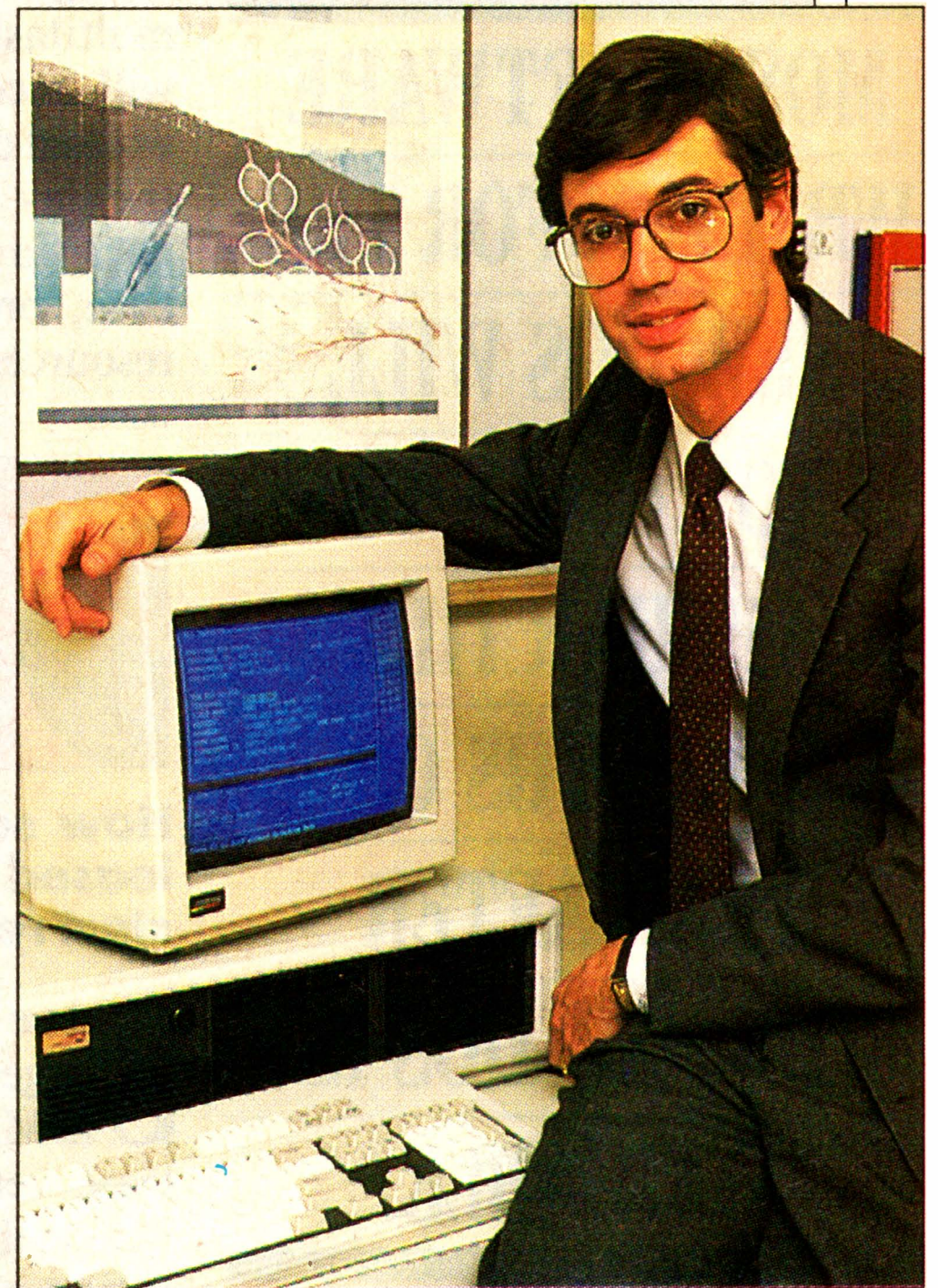
On the basis of the performance of the lone 386 he bought in 1986, Sherman says it's likely that the company's 1987 budget will include provisions for upgrading the company's 80286 users to 386s and 8088 users to 286s. That doesn't mean that Sherman isn't concerned about the ramifications of an advanced operating system designed for the 286 generation of computers. "Even if a new DOS comes out and it doesn't do quite all we want, it just wasn't worth not making that additional step up to a 386," he says.

The company's computing needs are heavily focused in engineering-related areas. ESS works with architects, engineers, and building owners to evaluate energy consumption in large facilities. The company builds models that simulate data over the course of a year, using actual weather information and performing thousands of calculations an hour to estimate annual utility bills. Before acquiring the Compaq Deskpro 386, ESS used a PC AT as a terminal to a mainframe, which performed the calculations. Now, the 386, which is hooked up to a 3Com network along with 10 PC ATs, can handle some of the models. Ultimately, Sherman hopes to avoid using mainframes entirely.

Sherman assessed the specifications of several 386 machines before deciding to buy a Compaq. Even though the manufacturers of other 386 machines promised compatibility with existing applications, his major concern, Sherman had problems with the design philosophy of the other machines he considered. He rejected one because its memory expansion was 16 bits compared to Compaq's 32-bit memory expansion. Another was dropped from the list because it came with a socket for an 80387 numeric coprocessor, which hasn't been released, while the Compaq came with an 80287 math coprocessor. He would have considered an IBM 386 had it existed when he needed it. "I need the speed and power. Whoever gives it to me, that's where I'll go."

The fact that IBM didn't have a 386 available didn't cause Sherman to hesitate. "The way we look at it is, even if they [IBM] do go proprietary, the only way they could hurt us is with a proprietary operating system," Sherman says. "Even if that's the case, we'll at least get AT functionality out of the Compaq. We're willing to take that chance." Sherman believes IBM would be foolish to stray too far from the installed MS-DOS base. He also is confident that DOS developer Microsoft will continue to support "the Compaq environment."

—S.R.R.



CHUCK SHERMAN: Using 386s instead of mainframes is the ultimate goal.

TOM IVEY

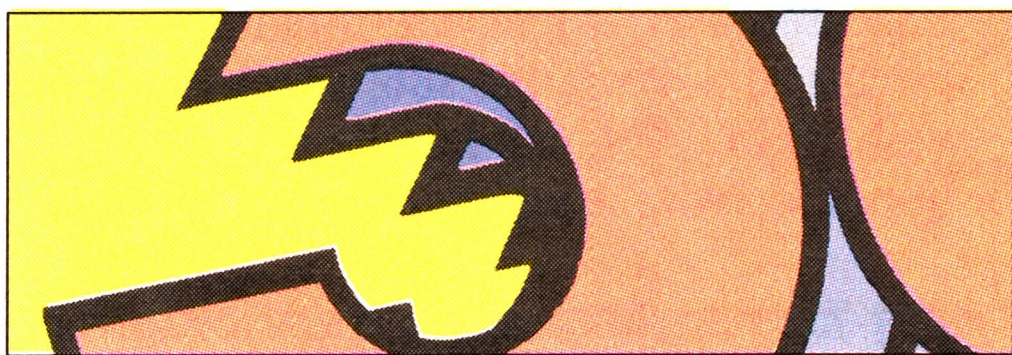
**MOST SOFTWARE
WRITTEN FOR THE
NEW DOS WILL
NOT BEGIN TO
APPEAR TILL
SIX MONTHS OR A
YEAR AFTER
THE NEW DOS IS
AVAILABLE.**

vanced help functions within a given program. If you are learning a new program, these latter functions would give it an uncanny ability to predict your intentions and show you how to accomplish them in the program. Alongside such developments, the power and multitasking ability of 286/386 computers will accelerate the trend toward vast networked computer systems, perhaps hastening the day when all "personal" computers are part of a single extended network sharing data base, processing, and telecommunications resources.



How soon after the new DOS is released will programs designed for it start reaching the market?

Some could be announced simultaneously, largely by companies that Microsoft and IBM are permitting to work with prerelease versions of the new DOS. Microsoft will probably have new versions of its application packages—such as Word and Chart—ready when ADOS is announced. But the majority of software that takes advantage of the new DOS probably won't begin arriving until six months or a year after Microsoft releases ADOS. Programs that will take the most advantage of ADOS, such as sophisticated artificial intelligence and CAD packages, will likely take the most time to develop.



If we won't see 386DOS for a couple of years, then why the fuss about 386-based computers?

There are a number of reasons, but the most important seems to be that the 386 processor has a potential no other processor for a personal computer has ever had before. Because of its 32-bit architecture, ability to use four gigabytes of memory, advanced multitasking capability, and DOS compatibility, 386-based computers have tremendous potential as stand-alone systems, as graphics workstations, and as servers for multiuser systems.

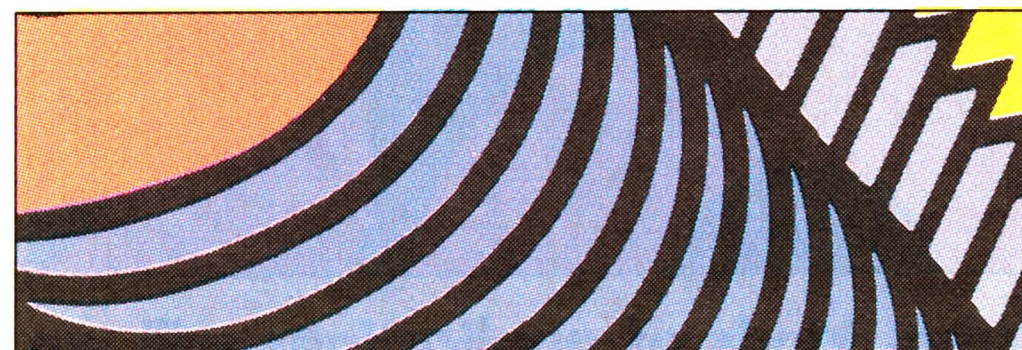
The capabilities of the 386 processor will also enable software developers to create programs that are vastly more powerful, yet easier to use. In fact, 386 PCs may reduce the role of mainframes in data processing.



How well will ADOS work with the 386 processor?

It will work fine, but will only address 16Mb rather than the four gigabytes the 386 processor's protected mode can address. That is because the new DOS will run in the 286 protected mode, which is a portion of the 386 protected mode. Thus ADOS will retain the limitations of the 286 chip even when running on a 386-based computer. This is analogous to 1Mb memory limitations imposed by DOS 3.0 when running on a 286.

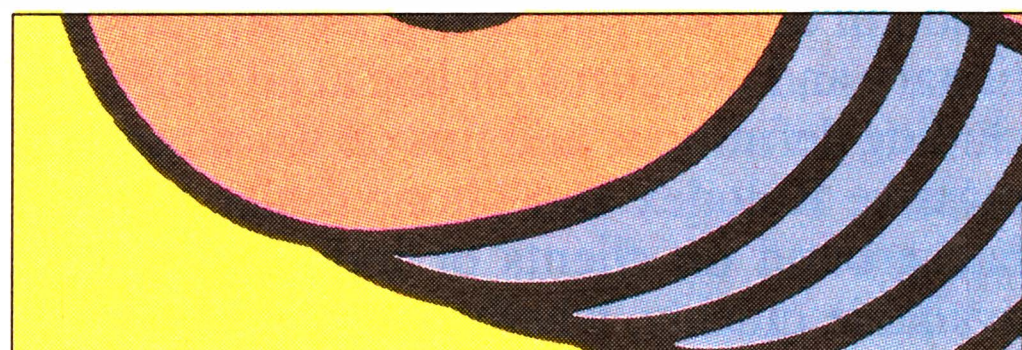
The four-gigabyte limit and multitasking ability of the 386 protected mode cannot be used until a DOS version and new applications have been written specifically for the 386 protected mode.



What about the new protected mode of the 286—will software written for that under ADOS be compatible with 386-based computers?

Absolutely, says Dana Krelle, Intel's marketing manager for advanced processors. "The 386 protected mode is a proper superset of the 286 protected mode," he says. "Anything in 286 protected mode will run in the 386 protected mode in the identical fashion." It's just that ADOS can't take full advantage of the 386 chip.

At least that's the theory. Since ADOS is not released yet, we'll have to reserve judgment about possible exceptions, bugs, and other reasons why ADOS might not be as perfect a fit on 386 machines as it will be on the 286 ones for which it is designed.



Are there any problems running software designed for the PC, XT, and AT on 386 computers?

At present, there are no problems running existing software in the real and virtual-86 modes of a 386-based machine. In the real mode, you can run one program at a time. In the virtual-86 mode you can run programs

THE CORPORATE PERSPECTIVE

Assessing the potential uses for a new generation of personal computers is no small feat for any company. When the company has more than 30,000 employees and 7,000 personal computers, the list is endless.

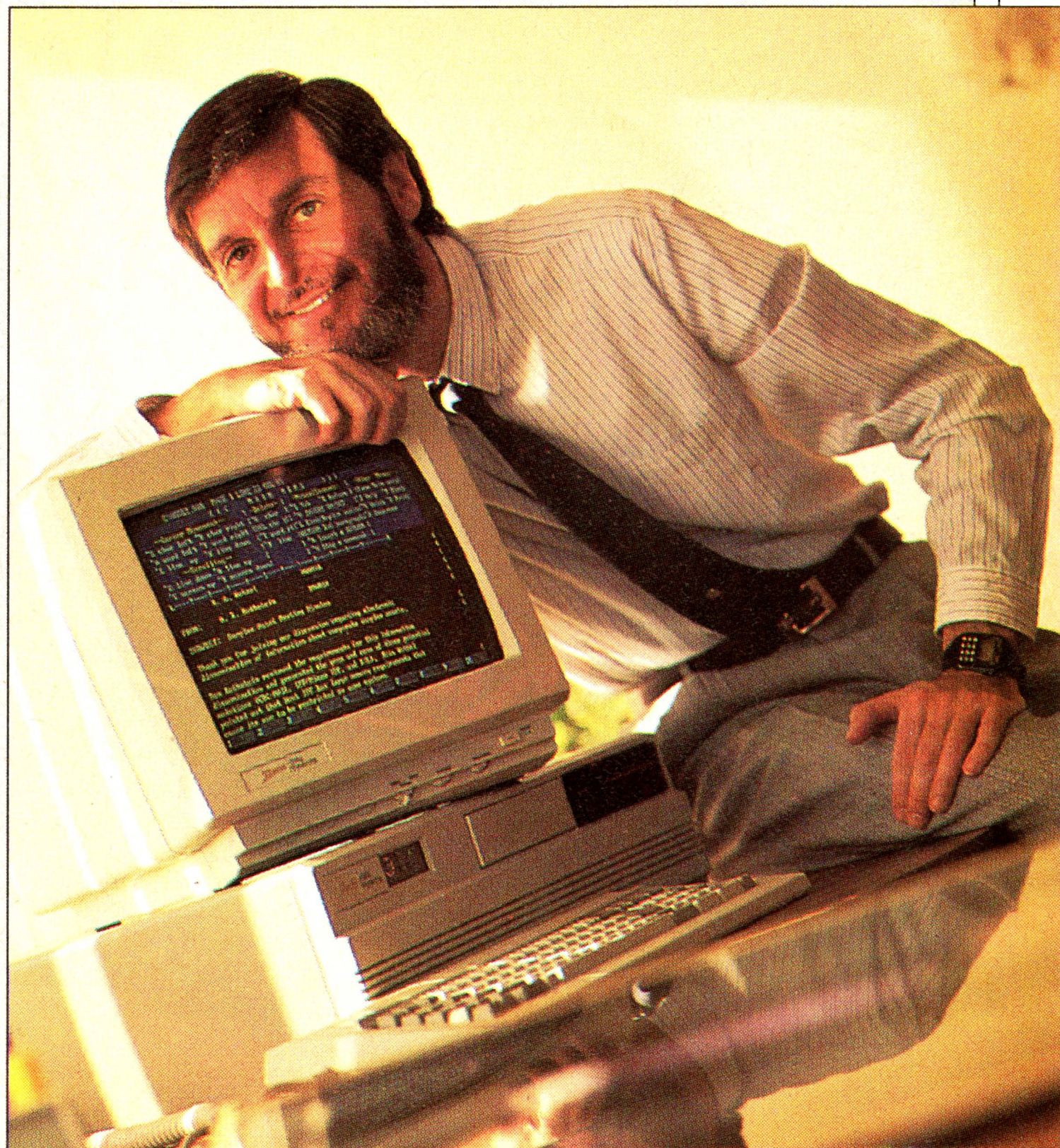
"We have a little different perspective than a single user does," says Ron Rothstein, who is in charge of all those considerations for Control Data Corp. (CDC) in Minneapolis, Minn. Shortly after the first of the year, Rothstein expanded the perspective of his office to include the 80386 generation, particularly a prototype version of the Zenith Data Systems Z-386. As manager of Micro Workstation Technical Support Services, Rothstein set out to determine what a 386 could bring to the party. In addition to using computers for applications common to any large corporation, CDC is a reseller, packaging hardware along with business, engineering, and educational software for its customers.

Along with other large customers, CDC was asked by Zenith to serve as a test, or beta, site for the new machine, keeping track of the bugs that are inevitably found in any preproduction piece of hardware. Rothstein is quick to point out that agreeing to conduct tests on a new machine isn't an endorsement, especially since CDC buys computers from a number of companies besides Zenith. That said, he also says that he likes the Z-386.

The analysts involved in testing the 386 had a long list of things to look for, including but not limited to raw performance, both as a stand-alone machine and on a network; compatibility with MS-DOS and the IBM architecture, both hardware and software; the number of expansion slots and ports; the power supply; FCC certification and Underwriters Labs approval; reliability; availability; training and support from Zenith, including being able to get enough information to educate CDC employees about the technical aspects of the machine; price; the amount of space required on a desk top; fan and disk noise. On another level were business considerations such as Zenith's long-term prospects as a personal computer manufacturer, the breadth of its overall product line, and its upgrade and pricing policies.

All indications are that the Z-386 passed. "Overall, we're pretty positive about using 386-based systems with Control Data applications," says Rothstein. "In those areas where the added performance justifies the added costs, we'll go ahead and use them." Those areas include users on networks, those with engineering applications, and those who spend a lot of time waiting for Lotus 1-2-3 to recalculate or dBase to sort. If reaction to the beta machine is any indication, he also expects that some CDC users will want to upgrade from an IBM PC or PC AT-class to a 386.

CDC's tests showed that the 16MHz Z-386 equipped with 1Mb of RAM will save more than five or 10 seconds here and there. Matched against 8088-based machines, it was about six to 11 times as fast at tests that included multiplication and division, sorting, and memory access. It was about two to two and a half times faster than Zenith's Z-248, an AT-compatible running at 8MHz with no wait states. The beta unit didn't come with a numeric coprocessor, which would make the differences more noticeable for scientific calculations. It was about 25 percent faster than the 80286-based Z-248 on input/output tests



RON ROTHSTEIN: "It's not worth waiting....We're excited about new technology and applying it wherever it makes sense."

such as accessing the 40Mb hard disk, which CDC coincidentally supplies to Zenith.

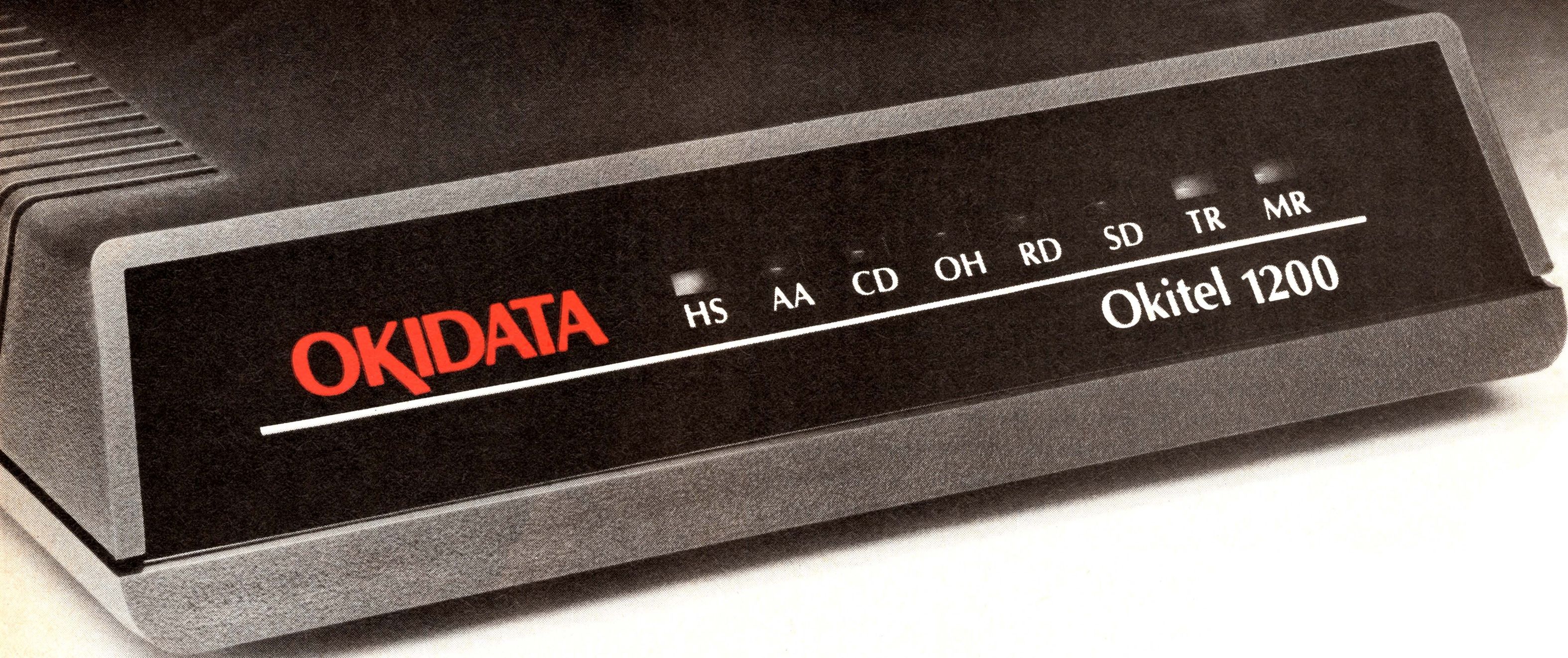
The machine wasn't flawless. Problems were evident on some copy-protected software. The high-density floppy disk drives are so fast that they can cause such software to fail copy-protection tests. Similar problems were reported by beta users of Compaq Deskpro 386 computers. Like Compaq, Zenith will correct the flaw. Most software, including WordStar and MultiMate as well as proprietary CDC programs, such as IM/personal and Control Data Connect, ran without a hitch, according to Rothstein. The Technical Support Services testing also uncovered potential maintenance and training problems because switch settings are different from those on current machines.

On the basis of the early testing, Rothstein says he won't hesitate to recommend 386 machines for some CDC users. His reasoning is based, in part, on an assumption that Microsoft's DOS for 286 machines, which is expected later this year, will maintain some compatibility with existing applications rather than break new ground. "If it doesn't support existing applications, we will have to make some tough decisions," he says. And while he's aware that IBM might choose to take a proprietary hardware route, Rothstein isn't overly concerned. "It's not worth waiting until it's all sorted out," he says. "We're excited about new technology and applying it wherever it makes sense."

—S.R.R.

JAMES SCHNEPP

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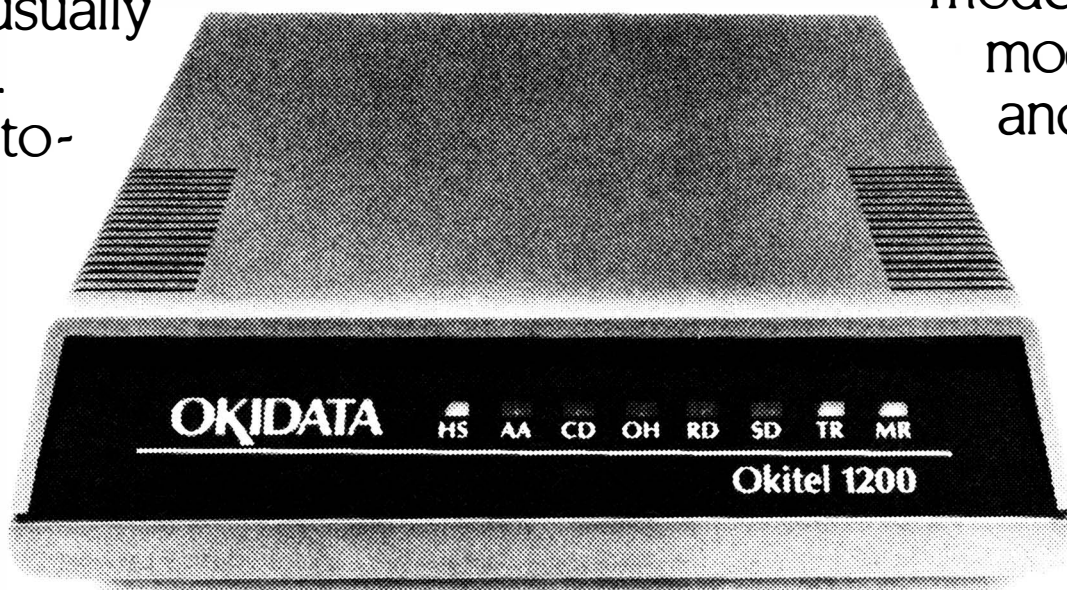
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simultaneously (subject to the limitations of the 8088/86 chip), provided you have Desqview or another operating environment that will permit multitasking. In this mode, you can run any number of what are referred to as multiple virtual DOS sessions—the result is like having several personal computers on your desk.

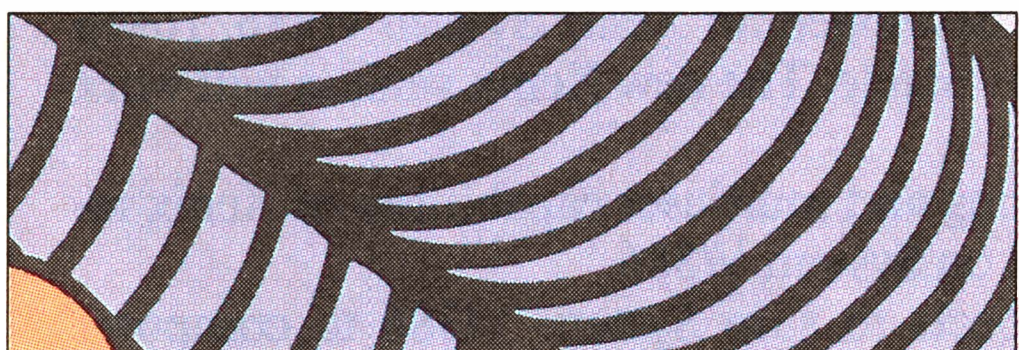
Existing DOS programs will not run in the protected mode. There'll have to be new programs written specifically for the protected mode before you can take advantage.



Since 286 hardware in the form of the IBM PC AT and compatibles has been available since early 1985, why is it taking Microsoft so long to develop the operating system?

Microsoft says it takes a lot of time to develop software, especially a complicated operating system. Others point to IBM as the reason a new DOS hasn't been introduced, suggesting that it either wants to delay the 386 generation or add proprietary extensions to DOS. Such additions take extra time. In fact, it has even been suggested in an insider newsletter (*California Technology Stock Letter*) that IBM is putting proprietary layers on the 386 chip itself, something it has a legal right to do. These are complex changes that probably could not be completed before the fall of 1987, and could even delay future releases of MS-DOS.

But the primary slowdown is the extremely complex nature of the job. The 386 chip required more than two years' development time by the team at Intel. Designing and debugging a software operating system for it that will maintain compatibility with earlier DOS versions while exploiting advanced modes is a daunting one. It takes time.



Why doesn't Microsoft just introduce a new DOS on its own without waiting for IBM? And what is the difference between PC-DOS and MS-DOS?

Microsoft contends that DOS isn't just another software program, because it must be written to work on specific hardware. So far, every version of DOS has been tailored initially to IBM hardware. In the past, IBM has announced its PC-DOS simultaneously

ECONOMIC POWER

Economist Harry Bowen has no trouble explaining why he bought a 386-generation personal computer. It's proficient at regressions, which figure prominently in the statistical analyses he performs at the National Bureau of Economic Research, a nonprofit organization in Cambridge, Massachusetts.

Before buying a Compaq Deskpro 386, Bowen performed real-world benchmark tests using a data base that has to cope with nine variables, 50 observations, and 27 iterative regressions at a time. The task took 25 minutes on a 6MHz PC AT and 15 minutes on the 386, which has an 80287 math coprocessor.

Since buying the 386, Bowen has become even more aware of how slow the basic PC clone he has at home is. He recently spent "essentially all day" working on a project at home. The same project took only two hours on the 386 he has at his office.

Bowen, who is a professor of economics and international business in the Graduate School of Business at New York University, is on an Olin Fellowship at the bureau, an organization that disseminates economic information and research. He uses the 386 primarily for word processing and to run the personal computer version of Statistical Analysis System, a mainframe program. When his fellowship ends this summer, the 386 will accompany Bowen to NYU, along with his other two computers, a PC clone and a portable. Bowen anticipates using the 386 for the foreseeable future, and is excited about exploring the multitasking capabilities likely to be part of a new operating system.

Despite some concern about the ramifications of a new DOS and the ultimate capabilities of the Intel 80386 chip, Bowen says he decided to go ahead and buy one now because, at worst, he'll end up with a fast AT. He opted for a 40Mb hard disk and 2Mb of RAM. He chose an AST Enhanced Graphics Adapter and NEC's Multisynch monitor in lieu of the EGA card and monitor that Compaq sells as options.

Bowen's concerns about an operating system that will take advantage of his new machine are relatively minor. Through trade publications, he has kept up with the rumors about an advanced DOS but says he didn't have time to get into it deeply before buying the Compaq. "If someone comes out with an operating system, I'll be happy with it," he says. Articles about the possibility that the virtual mode of the Intel 80386 chip itself isn't as advanced as he thought caused some disappointment.

Bowen plans to use the 386 as a stand-alone machine so he doesn't have to worry about many of the potential problems corporations face as they integrate a new generation with hundreds or thousands of 8088- and 80286-based computers and scores of existing applications. "To me, a personal computer is personal."

After using the machine for several weeks, Bowen says he has a few minor complaints about the keyboard layout and the speed of the tape backup. He's also doesn't see much reason for a 1.2Mb floppy disk drive as long as there's a tape backup. Overall, though, he describes himself as "real happy" with it.

Shortly after buying the 386 Bowen thought that he had a major problem when the disk drive got stuck and wouldn't boot from the hard disk. His concerns increased when he remembered that he hadn't backed up his work. He returned the machine to the dealer, who initially said a new drive would have to be ordered, with delivery in two months because of an order backlog. Before agreeing to wait for a new drive, Bowen suggested trying the drive after it had been removed from the case. Miraculously, the drive worked, was reinstalled, and hasn't been a problem since.

—S.R.R.

386 OPERATING SYSTEMS

According to its specifications, Intel's 80386 processor can run programs in DOS and Unix concurrently, and use four gigabytes (4Gb) of memory. But the 386 processor can do none of those things with current versions of MS-DOS.

A new version of MS-DOS that is expected to be released by Microsoft this year will not fully tap the power of the 386. The "new" DOS is expected to address the 16Mb memory capacity of the 286 chip's protected mode, but not the 4Gb limit of the 386 chip's protected mode. Further, existing applications will have to be rewritten to take advantage of the added memory the new DOS addresses.

At present, the only way to enjoy 386 perks, besides speed, is to use a different operating environment in addition to, or in lieu of, MS-DOS. The following is a rundown of alternative operating environments either available now or that will be introduced in the near future.

DESQVIEW 2.0 from Quarterdeck Office Systems is a multitasking MS-DOS environment that operates in the virtual-86 mode of the 80386 processor. It is an enhanced version of the original Desqview that enables users of 286-based computers to run applications simultaneously. Users can run nine MS-DOS applications simultaneously. The maximum amount of addressable RAM is 640k unless extended memory is present. It retails for \$130.

Version 2.0 is an upgrade of version 1.3, the first Desqview version designed for 386-based computers. Changes in version 2.0 include the ability to run programs designed for TopView, GEM, and Windows; and improved display of colors on an EGA monitor. *Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, CA 90405; (213) 392-9851. (For more information, circle 370 on one of the Free Information Cards.)*

PC-MOS/386 from The Software Link is an MS-DOS-compatible operating system that does not require the presence of MS-DOS to run.

PC-MOS/386 permits multitasking of current applications in the virtual-86 mode. The Software Link expects to run software written for the 286 and 386 protected modes once that software becomes available. In the virtual-86 mode, PC-MOS/386 runs an unlimited number of MS-DOS applications simultaneously. Each application is restricted to 640k of RAM unless extended memory is present, and the application supports the Lotus/Intel/Microsoft extended memory specification.

The Software Link plans to introduce a single-user version of PC-MOS/386 (\$195) and two multiuser versions early this month. One multiuser version supports five users (\$595) and the other supports 25 users (\$995). *The Software Link, 8601 Dunwoody Place, Suite 632, Atlanta, GA 30338; (404) 998-0700. (For more information, circle 371 on one of the Free Information Cards.)*

VM/386 from Softguard Systems is a single-user environment that runs applications in the virtual-86 mode and requires MS-DOS. VM/386 can run any combination of DOS and Unix software and any other software designed to run on an 8088- or 80286-based computer.

VM/386 does not provide windowing of programs but does work with programs offering this feature, such as

Microsoft Windows, and Quarterdeck's Desqview. You can cut and paste data between applications with VM/386.

Softguard plans to sell VM/386 to corporate accounts and distribute it through retail stores by June. The company will also distribute it to computer manufacturers to be bundled with their computers. Softguard is considering selling VM/386 for slightly under \$300 but no price has been set. *Softguard Systems, 2840 San Tamos Expwy., Suite 201, Santa Clara, CA 95051; (408) 970-9240. (For more information, circle 372 on one of the Free Information Cards.)*

VP/ix enables any number of DOS and Unix applications to run simultaneously. Developed jointly by Phoenix Technologies and Interactive Systems Corp., the program enables users to use DOS commands and load DOS applications from the Unix prompt and vice versa. The primary markets for VP/ix, according to Lance Hansche, vice-chairman of Phoenix Technologies, are owners of 386-based computers who "experiment with both DOS and Unix," people in a multiuser environment with a mixture of Unix and DOS packages, and Unix users who want to be able to use the wide range of DOS applications.

Two versions of VP/ix will be sold: a single- or two-user version (\$495) and a version for three or more users (\$795). Phoenix and Interactive Systems will sell VP/ix to computer manufacturers who will offer it with their 386-based computers. *Phoenix Technologies Ltd., 320 Norwood Park South, Norwood, MA 02062; (617) 769-7020; and Interactive Systems Corp., 2401 Colorado Ave., Santa Monica, CA 90404; (213) 453-8649. (For more information, circle 373 on one of the Free Information Cards.)*

MERGE 386 from Locus Computer Systems also enables users to run DOS applications from Unix and vice versa, and run DOS and Unix applications simultaneously.

Locus is distributing Merge 386 through computer manufacturers and expects that the manufacturers will offer it to the public sometime during this coming summer. *Locus Computing Corp., 3350 Ocean Park Blvd., Santa Monica, CA 90405; (213) 452-2435. (For more information, circle 374 on one of the Free Information Cards.)*

XENIX SYSTEM V/386 from Microsoft Corp. enables programs to use the 32-bit architecture of the 386 chip and address 4Gb of memory. System V/386 also runs Xenix software written for the 8088 and 80286 chips. When it runs Xenix programs developed for Xenix System V/286, 16Mb of memory are available. The new Xenix version will work with VP/ix.

The multitasking and multiuser capabilities of Xenix remain unchanged on System V/386.

Microsoft expects to ship System V/386 to computer manufacturers by the end of March; and to Santa Cruz Operations, which will distribute System V/386 to value-added resellers. Maritz expects the "typical price" for the new version to be in the \$500 to \$600 range. *Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080. (For more information, circle 375 on one of the Free Information Cards.)*

(For more information on all the products listed above, circle 376 on one of the Free Information Cards.)

—P.H.

with Microsoft's announcement of MS-DOS. PC-DOS is MS-DOS written to run on IBM hardware. MS-DOS is the name of the operating system that Microsoft licenses to non-IBM manufacturers. Working with Microsoft, the "other" manufacturers tailor MS-DOS to their hardware and release it as their own. They are called, for instance, Compaq DOS, Tandy DOS, or Zenith DOS.



In the meantime, could business people get some of the same benefits with operating systems that already have multitasking, like Unix and Xenix?

Yes. One problem at present is that most MS-DOS users would not realize enough benefits to make it worthwhile to learn an entirely new operating system. Secondly, Unix and Xenix do not have the thousands of software programs written for them that MS-DOS does. "Unix right now is for so called 'power users.' The command set is cryptic and unknown. DOS is cryptic also, but at least people know it," says Intel's Dana Krelle.

Phoenix Technologies, Norwood, Mass., is developing VP/ix, an operating environment for 386-based computers that will enable existing MS-DOS applications to run without modification under Xenix System V/386 from Microsoft (see related story). The new Xenix version from Microsoft is expected to be released shortly.



Can the 386 run Unix and DOS concurrently? Would running both help in network settings?

The 386 is able to run any combination of operating systems and programs under those operating systems concurrently. The only requirement is that you have enough memory to handle all the tasks.

Would it help in network settings? Yes, if there were a reason to run those or any other combination of operating systems concurrently. One likely possibility would be Unix running side by side with a business-oriented operating system such as Pick. A 386 computer as a file server on a network could handle both operating systems with ease—while providing MS-DOS capability as well. In fact, it

may really be in the networking arena that the power of the 386 will be felt most quickly.



At this point, can IBM fundamentally alter the 386 standard if it introduces a 386 computer that uses some proprietary components in its operating system?

Those companies that have announced 386 machines believe that the installed base of MS-DOS machines and software is too big a market for anyone, including IBM, to ignore. Compaq, which announced and shipped the first 386, contends that users, for the most part, won't follow IBM if it decides to market a 386 incompatible with DOS. A much likelier scenario has IBM introducing a 386 compatible with the existing hardware-software base but with built-in proprietary components. These could be in the form of IBM-designed chips containing portions of the operating system in ROM (read-only memory) or as additions to the 80386 itself. Such a move on IBM's part is quite possible. The results would cause some casualties among clone makers, followed by eventual copying of the proprietary components by others.



How do upgraded XT's and AT's compare to the capabilities of 386 machines?

Very well, it would appear. XT- and AT-compatible computers can be upgraded through a board to perform with some or all of the added features of a 386-based computer. The two types of upgrade boards are turbo boards and hypervisor boards. Turbo boards have an 80386 chip and supporting processors, on-board memory, and a crystal. The last allows the 80386 to run faster than the host computer. Hypervisor boards have everything but the crystal. They adhere to the clock speed of the host, giving them a 386's memory-management and multitasking capabilities but not much speed advantage. In fact, depending on the operation, processing may even be slower than with an AT.

You pay for the added speed of the turbo boards. They cost about \$1,500 and more, depending on how much RAM comes on the board. The hypervisor boards are priced at

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OF 80386-BASED
COMPUTERS
BELIEVE THE
INSTALLED
BASE OF MS-DOS
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UPGRADE PLANS

The most significant question for many computer users now is, "What difference will 386 computers running under the advanced version of MS-DOS make?" The advanced features available to the 386 generation of computers give rise to speculation about what new applications will be available—what new things users will be able to do with personal computers. To find out, we asked some of the major software companies how they plan to revise their products to exploit the benefits of DOS 5.0.

Unfortunately for those who like to look ahead, many of these firms are reluctant to acknowledge that they are even working with a preliminary version of the new DOS—due to strict nondisclosure agreements. In fact, one major company has been working with advanced DOS for almost two years. Aside from the nondisclosure problem, some companies would not divulge information regarding future changes to their programs or new programs they might be developing, because they did not want to tip their hand to competitors. Others said that until ADOS is released, it is impossible to predict exactly what changes will evolve. Micropro, Borland, Ansa, Computer Associates, and Symantec, for example, all stated only that they would support DOS 5.0.

In general, though, most of the companies said they will revise their programs to handle multitasking, but are waiting for the arrival of DOS 5.0 before making any definite decisions. The following companies were willing to offer some specifics:

ASHTON-TATE's major product lines will support DOS 5.0 and, consequently, benefit from the areas of multitasking and memory management. Regarding memory management, dBase users will find the programs's performance enhanced by having less need for disk access. All of the dBase code plus its data bases could be contained in RAM. To address the advantages of multitasking, which will allow, for example, a user to start printing a MultiMate document while executing a query in dBase, Ashton-Tate's single-application products will be designed to work together in a windowing environment for DOS 5.0.

MICROSOFT CORP. spokespeople said the firm plans to take advantage of DOS 5.0 by integrating its spreadsheet and word processing applications. DOS 5.0 will be able to address more than 640k of memory. Multiplan and Microsoft Word, for example, could be in memory at the same time. Microsoft will modify its packages so that they will be able to handle multitasking. It will likely increase the size of the spreadsheet for Multiplan, and alter Word and Multiplan so that they can handle background printing (for example, when you're in one program you can print a document from another). Another way the two programs might be integrated is by adding the capability for pasting spreadsheet information into the word processor.

SOFTWARE PUBLISHING's Harvard series will take advantage of DOS 5.0. The three programs in that series, The Total Project Manager II, the Professional Publisher, and Presentation Graphics, all could benefit from the new DOS, according to representatives of the firm. For example, the Professional Publisher, a desktop publishing package, could have its variety of font types all available in memory.

WORDPERFECT CORP. is moving toward adding multitasking capabilities to WordPerfect, MathPlan, and WordPerfect Library, according to company president, Alan Ashton. The company plans to step up the printing capabilities of the programs so that a user can be in WordPerfect Library, for example, and be printing a document in WordPerfect. Other areas of WordPerfect that are subject to change are its spelling checker and thesaurus. With the new DOS and its ability to address large amounts of memory, the spelling checker and thesaurus might be larger, faster, and kept on-line at all times.

—Stephanie Makrias and Heather-Jo Taferner

about \$500. Manufacturers of turbo boards include Intel, American Computer and Peripheral in Santa Ana, Calif.; Applied Reasoning of Cambridge, Mass.; Gold Hill Computer of Cambridge, Mass.; Quadram Corp. of Atlanta, Ga.; and Orchid Technology of Fremont, Calif. Manufacturers of hypervisor boards include Cheetah International of Longview, Texas, and American Computer and Peripheral, Inc., of Santa Ana, Calif.

Both boards are viable alternatives for someone who wants the benefits of an 80386 computer but doesn't want to scrap a healthy AT or compatible. Which one is right for you? It comes down to a decision about whether you want the speed or not. Gene Sumrall, vice-president of Cheetah International, says people "perceive they need a faster AT" when in fact they may not. He points out that while the Adapter 386 from Cheetah and other hypervisor boards may not provide faster speed, the ability to perform multitasking may save you all the time you need.

While a turbo board speeds the processing speed of an XT or AT, other computer operations, such as hard disk access, work at the same speed they would if the computer were still functioning as an XT or AT. A turbo board would work fine for someone who does a lot of spreadsheet recalculations, for example, because this typically happens in memory and does not require disk access. In contrast, word processing and data bases access the disk frequently and may perform slower than they would on a complete 386-based computer.



Since there are other 32-bit microprocessors, from companies like NEC and Motorola, why is there so much more interest in this Intel chip?

Because corporate America has adopted the IBM PC architecture as a hardware standard and MS-DOS as a software standard. The huge installed base, both hardware and software, guarantees an instant market for 80386-based products. Those users are likely to upgrade to 80386-based personal computers, partly because they can use existing peripherals and continue to run standard software.

The Motorola 68020 has many of the features of the Intel 80386, including the ability to address 4 gigabytes of RAM, but it has not been used in a personal computer that runs MS-DOS software. Apple's Macintosh, Commodore's Amiga, and Atari's ST use Motorola 68000s, which are 16/32-bit chips. So far, at least, software developers and mak-

ers of peripheral hardware have seen more potential business in writing for the Intel family of chips because that's what businesses use.



If Intel is on target and ships between 500,000 and a million 386 chips in 1987, what sort of pricing will we see in 1988 on such computers?

It's unlikely that mainstream prices will drop much below \$4,000 for a hard disk-equipped computer. Manufacturers are currently paying about \$300 for each 386 chip they buy from Intel, which says it sold 90,000 386 chips in 1986, compared to 1.4 million 286 chips.



How many 386-based personal computers will be on the market by the middle of 1987?

Intel says it is working with more than 150 companies designing products that use the chip. Chips and Technologies, Milpitas, Calif., which sells a 386 companion chip set to companies that don't want to design their own motherboards, estimates that from 30 to 50 manufacturers will be selling 386 computers that use their chip set by the middle of 1987. And while personal computers are the largest 386 marketplace, they're by no means the only products to use the chip.



What are the thousands of users who have already purchased Intel 80386-based personal computers using them for right now?

The primary motivation cited by the users we have interviewed is to speed existing applications. Even a turbo-charged AT can seem to take forever to sort a large data file or recalculate a big Lotus 1-2-3 spreadsheet. With a math coprocessor, the first 386s on the market work at least twice as fast as the AT generation while maintaining software and hardware compatibility. Some users say 80386 file servers make their networks run

faster; others are buying them in lieu of scientific workstations for computer-aided design.



Is the 386 chip used in anything other than personal computers?

Among the places you'll find them are in minicomputers, sophisticated printers, robotics controllers, military guidance systems, and PBX telephone systems. They're also in machines used for developing artificial intelligence programs. Those applications can already use the chip's 32-bit architecture, which generated market pressure on Intel to release the chip even if the personal computer marketplace wasn't necessarily ready to cope with a new generation. Intel says it knows of more than 150 companies working on projects using 386 chips.



What's next for the 80xxx series? When will we see the 80486 chip? Is this beyond the personal computer arena, or will there be an endless succession of more powerful chips?

Development time for a new chip is about two and a half years. The 386 was formally announced in the fourth quarter of 1985 and became widely available about a year later. If that cycle stays the same, look for an 80486 to be introduced in the first half of 1988. Intel will say only that its 80486 chip will be 100 percent compatible with the 386 and will have performance that is several times higher. There's no end in sight.



When should I buy a 386-based computer?

When the price and performance of the computer meet your budget and needs. Don't wait for the new version of DOS if you need the speed now, but hold off if you have to have multitasking or access to massive memory. Until 286DOS is released, no one can say for certain that the 386-based computers won't have a few glitches. ■

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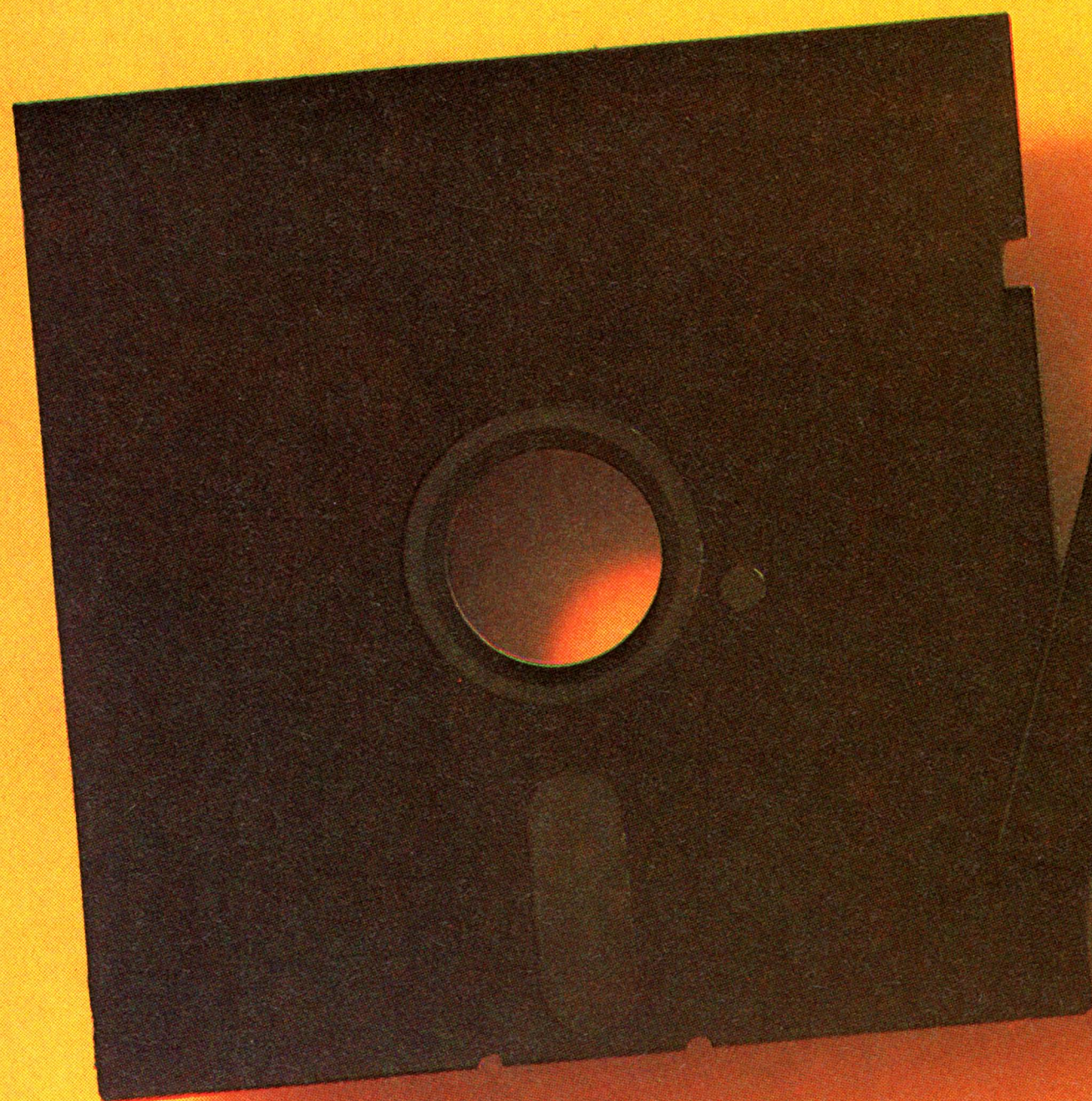
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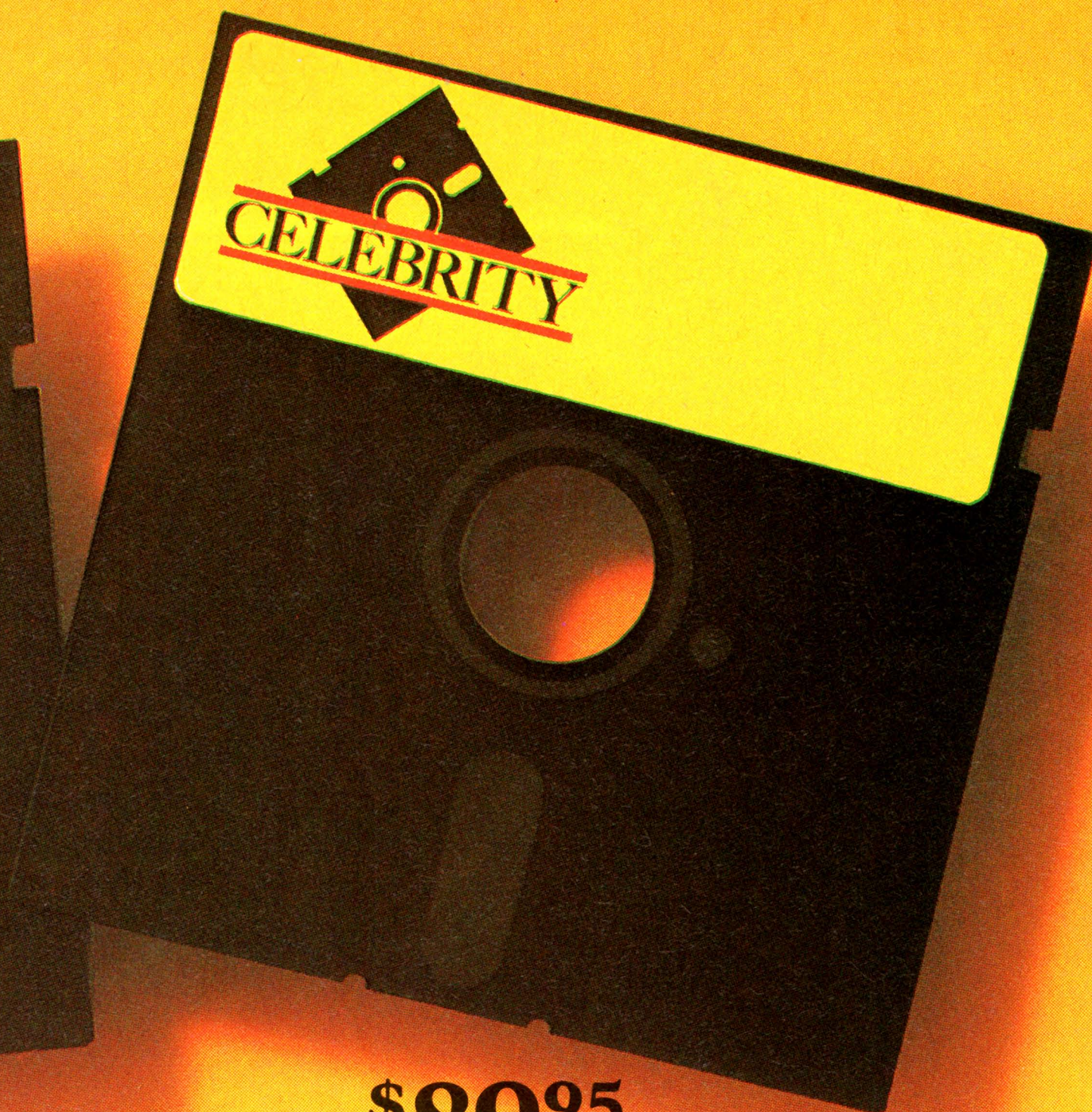
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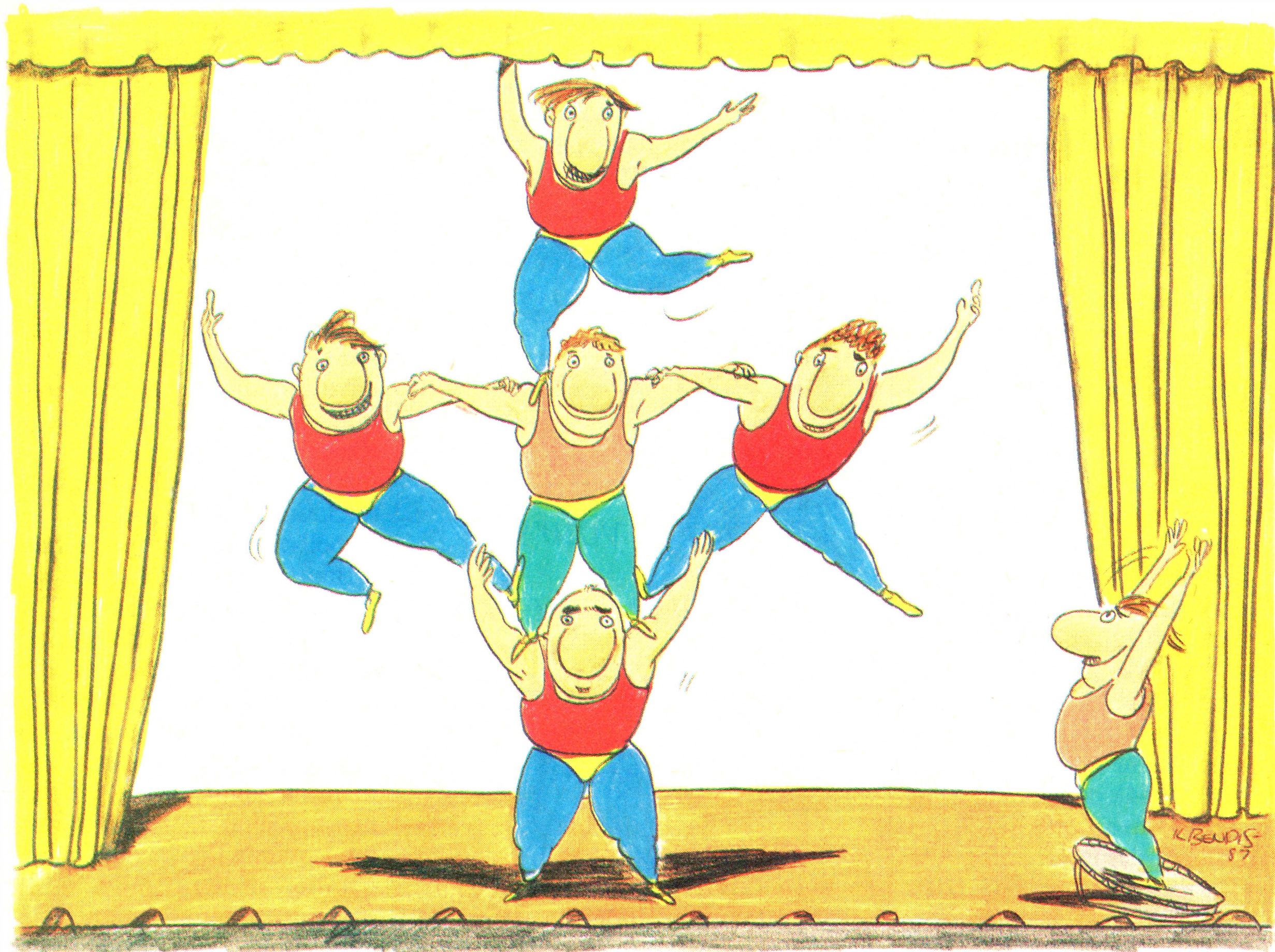
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One RAM-resident program may work miracles; several together can try the patience of a saint.

by Robin C. Nelson

You got RAM. I got RAM. All God's children got RAM. Yes indeed, specifying "640k on the motherboard" (for IBMs and compatibles) these days is about as exotic as making sure your new car comes with a radio. Why, if you shop around a little, you even find dealers who throw in the last 128k for free, to nail down the sale.

Yet, just having 640k of memory installed—plus maybe a meg or so on

the side in a memory expansion board—and using it productively are two different things. Very few mainstream, stand-alone application programs use all of 640k. The extra? That just sort of dangles from your saddle horn.

Unless, that is, you are either an MSU (Mammoth Spreadsheet User) or a successful experimenter—more later on

Robin C. Nelson is editor of CONSUMERS DIGEST and a multi-RAM-resident user.

why that is the appropriate terminology—in RAM-resident software. This kind of software, which programmers call TSR—for “Terminate, Stay Resident”—has only recently exploded into the vacuum of the average user’s RAM overhead. Its proliferation proves a point: Anybody who claims to have “enough” memory isn’t using it right.

Back when the MS/PC-DOS software developers were rushing out their various Major Solutions for word processing, spreadsheets, data bases, and asynchronous-type communications packages, they fixed on a target market of new users in what was then the ultimate environment: an IBM PC with the 128k RAM option—“loaded,” in a word. Thus, the winning entries (many are still earning their keep) were almost all comfortable in those cozy quarters; and some, like WordStar and dBase II, were straight translations of CP/M programs that had originally been taught to get along within the—imagine!—64k confines of 8-bit hardware. Then, when Lotus 1-2-3 and dBase III dared demand 256k, the known Universe seemed to have been plumbed. Other software authors who could figure out ways to upgrade their programs into 256k, presumably with some added performance, did. Many couldn’t justify it, and were honest enough not to. All was well—that is, until 1984.

Enter Borland’s SideKick—not the original attempt at providing a set of RAM-resident “desktop” utilities for IBMs and compatibles, but the first with enough marketing clout to catch on in a big way: To load the full set of SideKick utilities—notepad, phone dialer, appointments calendar, and calculator (the ASCII table is only to leave on the screen for effect when you step out of the office)—on top of a big applications package, you immediately needed 56k more than the 256k most of us had. And you went out and got it the day after the guy at the next desk showed you all those handy accessories popping up on his monitor.

Desktop utilities are fine, but there are other—sometimes better—ways additional memory, whether it’s in usable RAM or an expanded chipset out of the direct grasp of DOS, can be invested for profit: If you’re involved with disk-intensive text searching or data base operations, for example, virtual disk partitions (RAM disks) or cache buffers will pay you back in significantly accelerat-

ed operations—even on hard disk systems. And for getting the cursor quickly around in any kind of graphics or text screen, you may want a mouse driver in RAM, plus a mouse command “menu” for the specific application you’re running. For heavy keyboarding, on the other hand, a neat foot-pedal accessory called the PC Pedal takes a minuscule

*Insist on seeing
the software work
on a system that
resembles yours.
Otherwise, you are
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pig in a poke.*

chunk (under 10k) of RAM in exchange for the ability to put the Alt, Ctrl, Shift, or any other key underfoot to speed data entry in spreadsheets and data base screens as well as word processors.

Thus, performance enhancers now vie actively with desktop utilities in competition for “spare” RAM.

At the same time, IBM (TopView) and Microsoft (Windows) have spent good money trying to convince us that the best possible use for abundant RAM is to harbor a resident (DOS shell) “environment” that permits concurrent operation of multiple software programs. They spent and still spend, but users generally aren’t buying. (Quarterdeck Systems, which may actually have come closer to some of the same objectives than the biggies, with its Desqview and Desq variants, about got lost in the shuffle.) The multitasking DOS shells grab RAM in bunches—130- to 160k—with a payoff limited to use of “well behaved” applications that fit comfortably in remaining memory and thus tend to be either painfully slow or minimally functional. The heck with that. We didn’t pay for a Porsche so we could drive it at 55mph. In addition, it usually turns out that we only need a certain amount of concurrent access to preloaded programs plus a data transfer (cut-and-paste) facility, not true concurrent processing (namely multitasking), for which the demand in software dem-

onstrations far exceeds that of the average workplace.

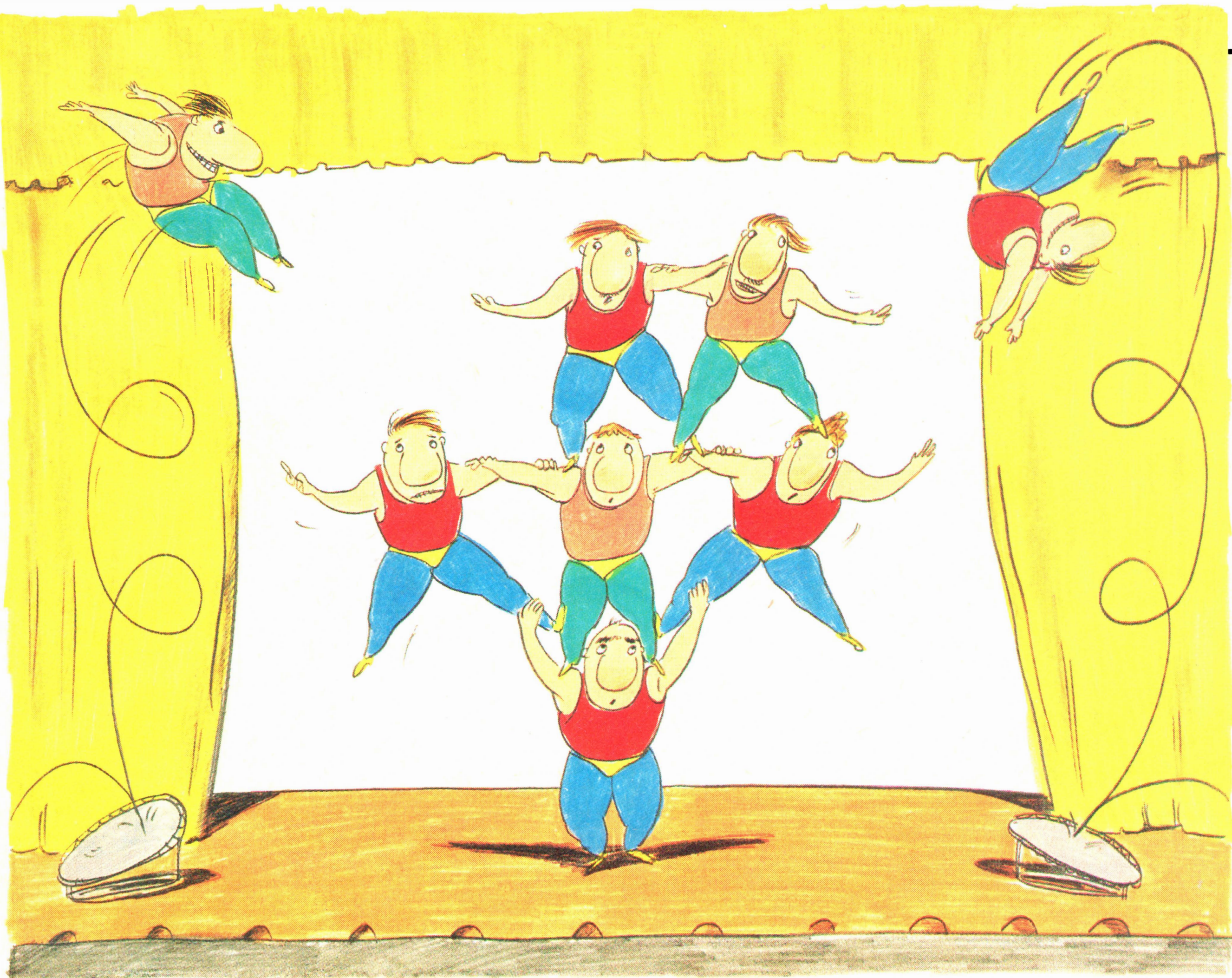
Another rap on the DOS shells is that they didn’t anticipate and therefore don’t readily accommodate the profusion of other TSR utilities. “Microsoft Windows was written with no thought of other RAM-resident programs,” asserts Stan Brin, president of Software Research Technologies, which makes the SmartKey macro generator, “as if they had blinders on.”

Now, contention for memory space is coming from a newer strain of TSR variants: RAM-resident programs that behave exactly like stand-alone applications and, in fact, can replace them. Recent entries have included programs for: business graphics, communications (including mainframe links), outlining, a spell-checker and a thesaurus, print formatting, financial analysis and, of course, RAM management.

There are, however, certain considerations—or let’s come out and call them reservations—any computer user must examine before assembling a RAM-resident support package to complement the applications that make his or her machine more productive. Foremost among them is the whole general question of the compatibility of TSR software programs with both present and future computers, peripherals, operating systems, programming tools, mainstream applications, and, last but not least, each other.

To a computer user, the magic of RAM-resident software is in its ability to effectively disappear, apparently clearing the system—or at least the screen—for unimpeded operations within a completely different software regime, and then to reappear instantly when called, ready to perform again. Far too often, however, when TSR programs are loaded and called up in combination or with applications that are written to sidestep certain DOS requisites, the computer will suddenly and unpredictably “hang up.” The only course is to reboot, taking whatever lumps come in loss of data and arrested productivity.

Why this happens is linked to some very technical underpinnings of both the IBM PC’s Basic Input-Output System (BIOS) and the way Microsoft designed the MS-DOS operating system. Because Microsoft has not published documented procedures for tying TSR programs to its MS-DOS (see related story), almost every effort to date made



THE ACROBATICS OF LOADING

The sequence in which RAM residents take their position in the computer is crucial.

by the 100-odd companies involved in actively producing RAM-resident software represents a programming team's "best guess"—including those being successfully marketed.

Ed Tolson, the president of SoftLogic Systems, a New Hampshire software company that has published a study of TSR programs, calculates: "Perhaps one out of 10 existing packages is actually coded correctly for the way DOS expects it to perform."

In addition, variations in the way certain compatibles' ROM chips emulate the proprietary IBM BIOS can cause them to reject TSR software that runs on other machines. SmartKey's Brin targets Zenith as one computer marketer with that problem; "Thousands of them have been returned to dealers to have changes made," he says. It doesn't end there, since there are even TSR compatibility variances between IBM PC versions. Because of a new keyboard, for example, one best-selling key-redefinition program will not run on IBM PCs sold since January 1st.

Given these circumstances, and in the simplest possible terms, "crashes" can

be said to occur primarily because the first requirement of any RAM-resident program—whether it generates keyboard macros, pops up a calendar, or references a 110,000-word thesaurus—is *not* to disappear from the system. On the contrary, it must perpetuate itself by notifying the computer's central processor of its memory "address," in effect securing squatter's rights to the portion of memory it occupies. It must also present its address at key locations in the BIOS called "Interrupt Vectors," through which the keystrokes that call it to action will pass.

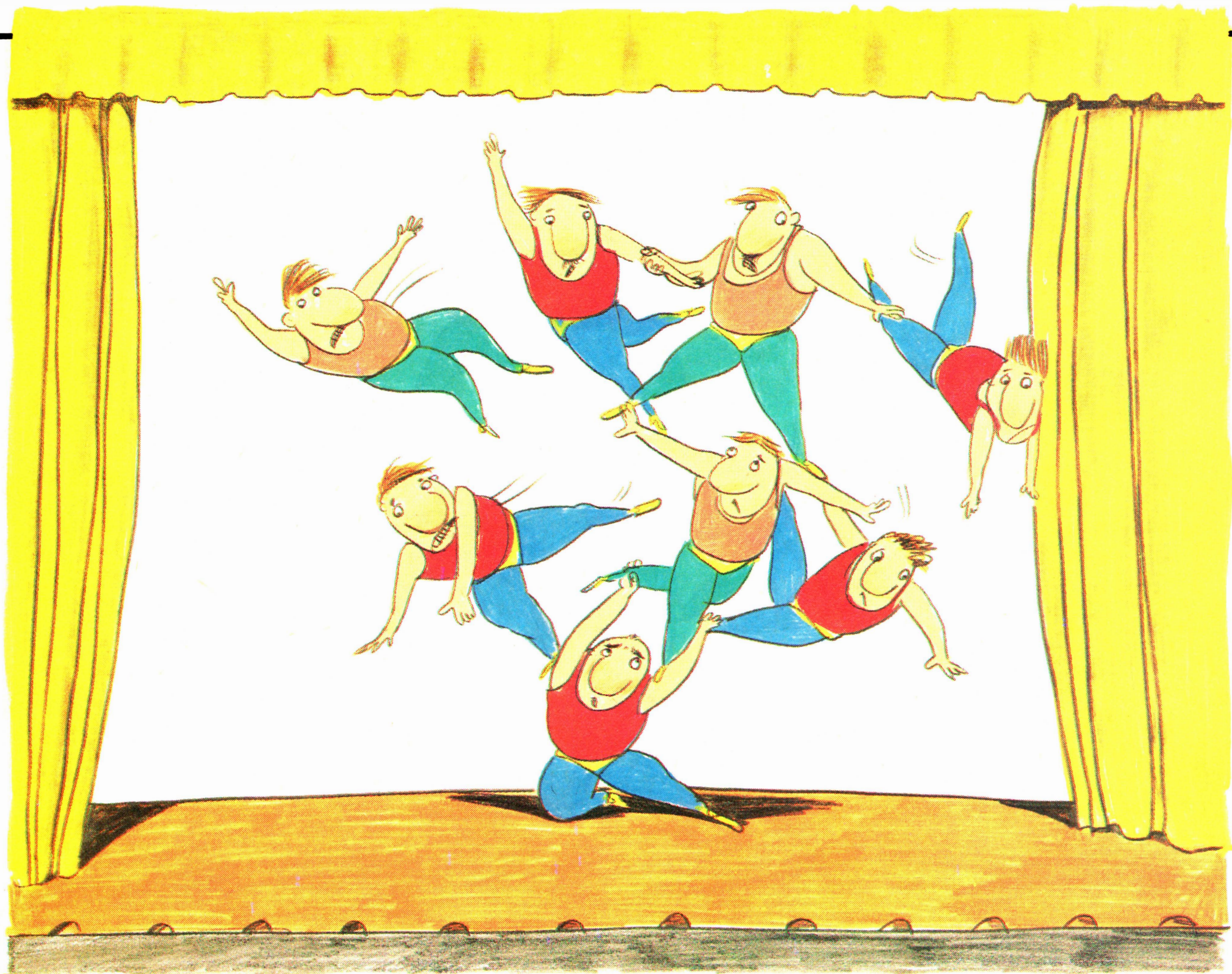
When a RAM-resident program trying to sit on the appropriate Interrupt Vectors and attract attention to itself has competition, problems are not far away. Most often, they occur when another TSR is in residence, but not always, nor is it a prerequisite. The Basic programming language shipped with MS-DOS packages, for instance, will simply not live together with most RAM-resident keyboard redefinition programs.

An "aggressive" RAM-resident program, one designed to intercept key-

strokes at the earliest possible point (known as Interrupt Vector 9 in IBM PCs), can be instructed to "nag" the CPU every time the computer's 50-millisecond clock ticks—20 times per second. In the process, it can often overwrite anything that is in RAM with it. Then, if the CPU is unable to contend with the conflicting instructions and illogical "holes" in memory, it goes into fibrillation. And the monitor screen—our only window into the process—immediately becomes, as they say in the Emergency Room, "fixed and dilated."

Software developers call this syndrome "RAM-cram." The poetic term is somewhat misleading, since the total amount of RAM occupied by the offending programs seems not so critical as the number and types in simultaneous residence, the quality of the individual codes (programming) and, sometimes, the sequence in which they are loaded. If you experience RAM-cram repeatedly in trying to load and work with several TSR packages, take a long, slow breath, get out the documentation, and do the following:

Check the loading sequence. Keyboard



WHEN POP-UPS COLLIDE

RAM residents that try to occupy the same space in memory will cause the system to crash.

redefinners should generally go into RAM ahead of anything that follows, so they can be "boss." Other TSR programs may specify loading in a certain position or sequence relative to others. Borland's SideKick is notorious, at least among competitive software developers, for demanding to go into RAM last—from which position it camps on Interrupt Vector 9 and wreaks havoc with anything not capable of protecting itself. Even if the documentation for your program doesn't specify a loading sequence, it may still be a critical factor, so, if problems persist . . .

Shuffle the loading sequence. Do it first while protecting the preferred positions of those programs that specify one. Re-load for a trial run; if the system still hangs up, try any and every combination—including those in which SideKick may not be last through the gate. Below is a batch file I evolved through trial and error and now use regularly to load my word processor (WordStar) to a RAM disk (Drive D:), along with the SuperKey macro processor, a special WordStar menu ("ws") for the Microsoft Mouse, SideKick, Webster's New

World Thesaurus, with its dictionary placed on the RAM disk, and lastly, the foot-pedal activator.

```
CD\WS
COPY \WS\WS*. * D:
CD\MOUSE
MENU WS
CD\KEY
KEY WS/M1
CD\SK
SK
CD\WS\THS
WTH -RM=D: -CR=N -I
PC PEDAL
D:WS
REFEREE ##
```

Putting in SideKick ahead of two other residents was the key; it goes against the Borland directive, but what the hell, they'll never find me in this corner of the galaxy . . . This setup lets me boost WordStar (version 3.31) with Alt-key combination macros so that it behaves like a full-featured, modern word processor; it gives me an instant thesaurus (via Ctrl-F6) with one-keystroke substitutions and, not at all least, it lets me use SideKick's calendar and calculator, plus its notepad to look at or import files from subdirectories that my old version of WordStar doesn't

recognize—I can even edit on a split screen, since SideKick's word processing command set is nearly identical to WordStar's. The foot-pedal program lets me assign the Alt, Ctrl, or Shift keys to my left foot—so I can jockey all the previously loaded capability around a little better, or just input faster if that's what I need to do. The last command operates after WordStar is exited and it cleans out RAM for the next job (more about this later).

It has not crashed, ever, on my (ITT Xtra) system—and note that the RAM disk driver itself, the Microsoft Mouse driver, and a cache-buffering program called FXP (proprietary to ITT) are already installed into RAM and Expanded RAM by the CONFIG.SYS file before this sequence even begins. So in spite of the perils, RAM can be thus crammed, without incident, if you find the right combination. But if you don't, then . . .

Isolate the offender. Subtract individuals, one by one, from the TSR group you are trying to load. There are clones now available for almost all of the popular TSR utilities, providing similar if not identical functionality, and what are ap-

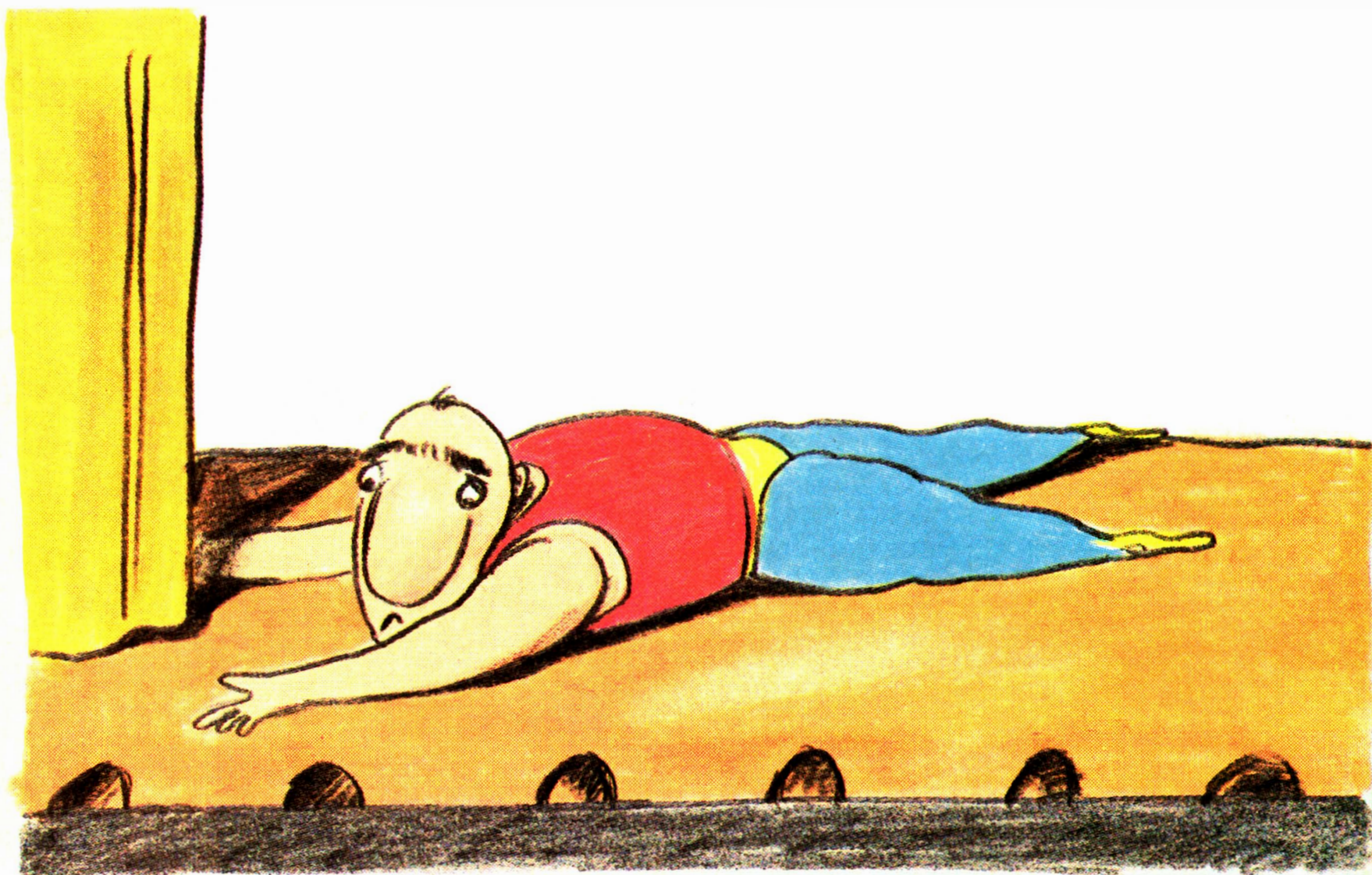
parently vast differences in the way they are coded may be the key to building a crash-proof assembly. If you use cache buffering or a DOS accelerator, try booting without them as well. But you still have another choice . . .

Go Borland. SideKick will collaborate wonderfully well with its TSR house-mates, and every day, it seems, there are more of them. So if your operational needs are fairly text-oriented and don't extend beyond a keyboard macro generator including a cut-and-paste module (SuperKey), speller/thesaurus (Turbo Lightning) and the desktop utility set, Borland will take your order and cram your RAM—the three loaded together will require from about 150 to as much as 360k RAM, based on a full SideKick menu and depending on Turbo Lightning's dictionary configuration options.

Those who produce a typical assortment of business-type communications should find the above assemblage more than adequate—the proofreader operates on any text-based data entry, not just word processing. Professional writers may prefer to have full-file, rather than Turbo Lightning's by-the-word or screenful spelling checks, and a thesaurus more conducive to exploring synonym chains than its basic prompter. A batch file that puts the all-Borland TSR package to work with my WordStar on a RAM disk is shown below. (You'll need at least a 512k RAM disk to be able, as I am, to put the full, hard-disk versions of Turbo Lightning's dictionaries into it, along with the WordStar program files, for by-the-word proofreading.) I keep my Mouse menu installed mainly for fast-cursoring to the misspelled words Turbo Lightning highlights in screen-scanning mode.

```
COPY \WS\WS*. * D:
CD \MOUSE
MENU WS
CD \KEY
KEY WL /ML
CD \LIGHT
COPY DISK.DIC D:
COPY THES.DIC D:
LIGHT
CD \SK
SK
D:WS
```

Close readers will note, I trust with interest, that the SuperKey macro file for WordStar—designated as “wl”—is a different one from that loaded as simply “w” in the first batch file. This is because Turbo Lightning uses as “hot” keys (or activators) several Alt-plus-function-key combinations I normally use as SuperKey macros with WordStar. To use Lightning and SuperKey together, I have to remove those as working macros—hence a separate file, differ-



A STANDARD FOR ALL?

The status of “Terminate, Stay Resident” software is, in the words of one software author, a “three-ring circus.”

The primary reason is the lack of standards for coding TSR programs to interact with MS-DOS. Because Microsoft has kept the DOS interface (interrupt handling) procedures a trade secret, every software developer takes his best shot. Some work well and don't crash computers; others are hopelessly incompatible and have had to be extensively overhauled after release because of the problems they cause.

The closest thing to a standard has been created by Borland International of Scotts Valley, Calif., the company that popularized the TSR concept with SideKick. Borland's products essentially grab the optimum position to be ready for keyboard entry, and then blow other programs (and sometimes the system) away. They do it via Interrupt Vector 9, which is the earliest possible point at which keystrokes can be intercepted.

Because of the problems caused by a lack of standards, a Colorado Springs, Colo., software company, Softronic, decided to write a “kernel” providing a single handle everyone could use to put TSRs into a DOS system without their interfering with one another. Last May, Softronic sponsored a conference to explore the idea. About 100 companies attended.

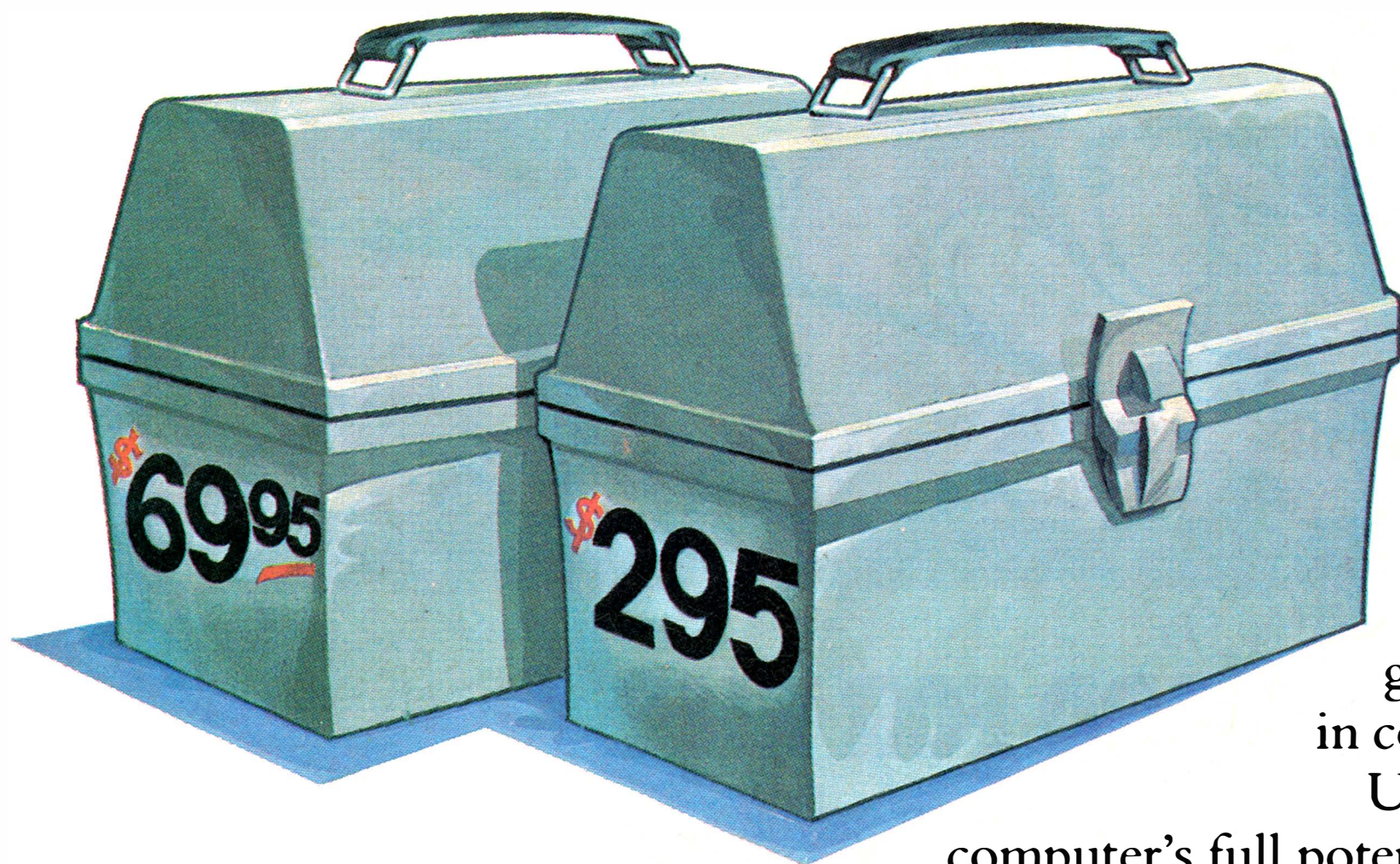
By the close of the conference, Microsoft had agreed to publish handles to DOS within three months while Borland and Rossoft, which makes ProKey, had agreed to produce a public domain Interrupt 9 handler within three weeks. Developers hoped that a standard would emerge from those two and the Softronic kernel. But neither the Microsoft nor Borland-Rossoft agreements have been kept.

Borland says its part isn't done because of “logistical” problems and because the company is still considering the proposal. Microsoft says it's still working on the DOS handles, intends to make them public, and apologizes to other developers for the delay.

Some companies, however, are tired of waiting. Chip Rabinowitz, director of software engineering for American Video Teleconferencing Corp. of Long Island, N.Y., is among those going ahead. According to Rabinowitz, a coalition of authors is producing a Ringmaster interrupt handler to tame the three-ring circus of TSR programs. Their efforts will result in a device driver that should be available by the spring of 1987 for a registration fee of \$25. Since all software written for it will have to be free/shareware, though, it's unlikely the standard will become widespread.

—R.N.

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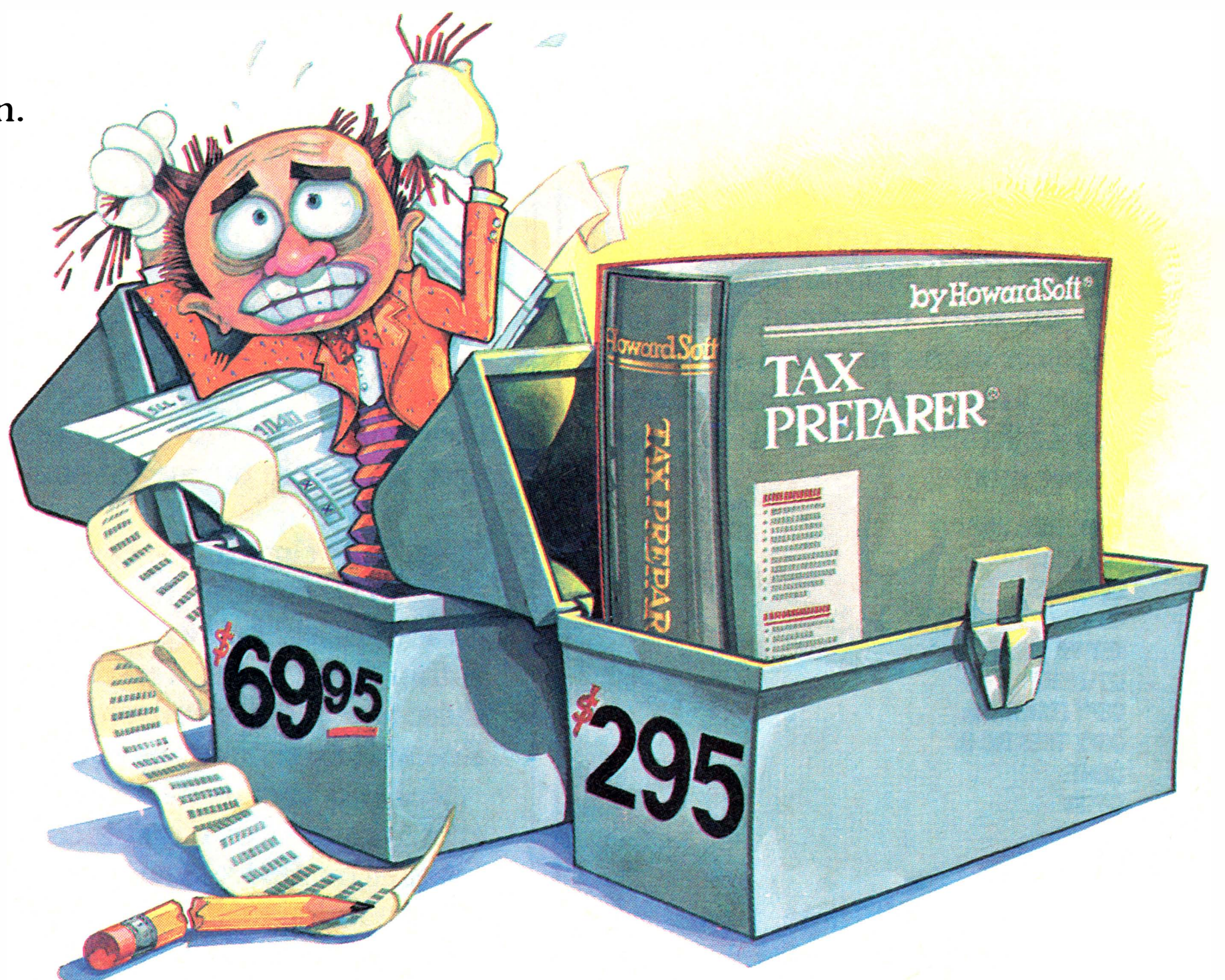
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ently named. This touches on an irony anyone out on the TSR frontier is familiar with: getting a bunch of things jammed successfully into RAM, only to find there is a keyboard conflict.

Do not, henceforth, ever become dependent on any TSR program that does not offer redefinable hot key(s); and a "kill" switch that will cleanly excise it from memory without leaving a puncture wound, so you can reclaim that space for your own devices, without your having to reboot the system.

Rebooting merely to clear memory belongs in the Neanderthal Age. Some of the older utilities that could not be removed without rebooting, however, can now be controlled by programs that can manage your RAM.

Referee, from Persoft, is one of them, and it may be somewhat overelaborate in offering both resident and nonresident versions for monitoring, activating, and deactivating all other RAM occupants (provided they are loaded after Referee). But if you'd rather use batch files than slug away at the keyboard to move the programs around, Referee is worth having for one feature alone: It gives you the opportunity to write a one-line batch file command that will blow all attendant RAM residents right out of memory anytime you exit the application initially called up by the same batch file. You don't have to use this approach, which does involve reloading resident utilities each time you switch applications; Referee can also instantly activate and deactivate selected programs (that remain resident) in preloaded "RAM teams" based on what you assign to each of your applications. But you don't retrieve the memory space occupied by a Referee-deactivated program and I find the clean slate/batch file method better.

Yet another approach is used by Softlogic Systems' Software Carousel; it creates discrete DOS partitions into which both resident and nonresident programs can be concurrently loaded. Unlike the multitasking DOS shells, however, Carousel has a "virtualization" feature that enables users to load programs with a total RAM requirement well in excess of that residing on the system. When these are then interchanged, the "overage" is swapped out to a predesignated space on the hard disk. Under this system, multiple replications of the same TSR program can reside in separate partitions, configured

POP-UPS FOR ALL OCCASIONS

The new breed of RAM-resident program (called TSR by programmers, for "Terminate, Stay Resident") is like an application program in itself. Though it resides in the background of other programs and must be called up via a hot key, this kind of program is more than a simple utility. Here's a sampling of the various kinds of TSR programs now available.

FINANCE 10 Offers 10 separate modules for use by financial counselors, accountants, and other professional types; includes loan amortization, lease vs. purchase, internal rate of return, future vs. present value, plus common statistical calculations (average, mean, standard deviation, etc.); includes depreciation schedules based on the new tax law. The RAM required is 128 kilobytes. The price is \$149. *Creighton Development Inc., 16 Hughes St., Irvine, CA 92718; (714) 472-0488 (For more information, circle 360).*

GRAPH-IN-THE-BOX Latest version, 1.2; enables user to instantly create business graphics (choice of 11 different chart formats) by evoking the program with numerical content on-screen and marking the block of data to be graphed. Graphics files can be saved for printing; works with word processors, data base managers, spreadsheets. The RAM required is 128k. The price is \$97.60 copy protected; \$147.60 non-protected. *New England Software, Greenwich Office Park 3, Greenwich, CT 06831; (203) 625-0062 (For more information, circle 361).*

INSET 2.0 This is the updated version of a program that permits merging of graphics files (images, signatures, graphs, charts, etc.) with text files for output on a wide range of dot matrix or laser printers. New features include on-screen preview of the merged images, and a graphics editor. [See review in this issue.] The RAM required is 32k. The price is \$99. *American Programmers Guild, Ltd., 12 Mill Plain Road, Danbury, CT 06811; (203) 794-0396 (For more information, circle 362).*

READY Outline formatter from the makers of ThinkTank can be used in conjunction with word processors; early versions had problems coexisting with other TSR programs but publisher has made necessary changes. The RAM required is 128k. The price is \$99.95. *Living Videotext, 2432 Charleston Road, Mountain View, CA 94093; (415) 964-6300 (For more information, circle 363).*

RELAY GOLD A heavy-duty communications package with a resident mode (includes unattended operation) with controls for allocating both RAM and CPU processing time (percentage) between Relay and other operations for optimum system configuration; available as Relay Silver (\$150) without mainframe-linking feature. The RAM required is 192k. The price is \$250. *VM Personal Computing Inc., 41 Kenosia Ave., Danbury, CT 06810; (203) 798-3800 (For more information, circle 364).*

(For more information on all the products listed above, circle 365)

—R.N.

differently (a different macro file, personal dictionary, etc.), and they will be available via a single keystroke.

When you gain access, however, the program is exactly as you left it—with whatever TSR aids that go with it standing ready. Softlogic president Ed Tolson calls this "everyman's multitasking"—not true concurrency, but instant access to multiple programs. Software Carousel requires debugging—a code patch—to run on some compatible systems. The company is also readying Shear Power, a cut-and-paste utility that will provide a dimension of fast data interchange between partitions.

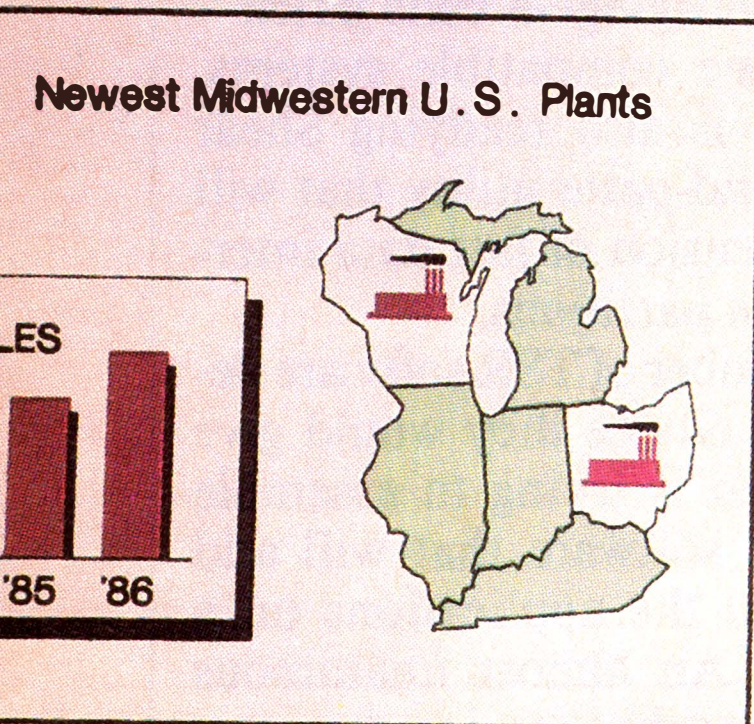
I asked a number of TSR software developers what advice they would give the person who is trying to assemble RAM-resident software that will add productivity to the applications on a given system. An almost unanimous first priority was that you insist on seeing the software demonstrated, before purchasing it, on a system that resembles the one on which it will be installed as closely as possible—down to RAM configurations, device drivers, print buffers, etc.—as well as in concert with the same applications software that will run on the system. Otherwise, you are buying the virtual pig in a poke.

The one most interesting observation came from Chip Rabinowitz, director of Software Engineering at American Video Teleconferencing Corp.: "I hate to say this, but counterparts of almost all commercial TSR programs are available in the form of 'shareware' you can download from, say, the Special Interest Group on CompuServe."

If commercial TSR software is properly coded for DOS only 10 percent of the time, I wondered, how good can shareware be? Rabinowitz, however, is emphatic. "Most of the people who are writing commercial TSR software," he says, "learned how to do it by writing shareware; in general, it's as successful—or unsuccessful—as the packages you can buy."

A number of other software authors feel that TSR performance will be enhanced in the future by the development of a standard interface with DOS. As for Microsoft's DOS itself, the best guess is that an upcoming version will include a standard—but no one would rule out the possibility that current TSR software will be made obsolete by it.

All these considerations aside, TSRs are definitely here to stay . . . and disappear . . . and return, at the tap of a key. For doing specific computing jobs exactly when you want them done, there is no better way. ■



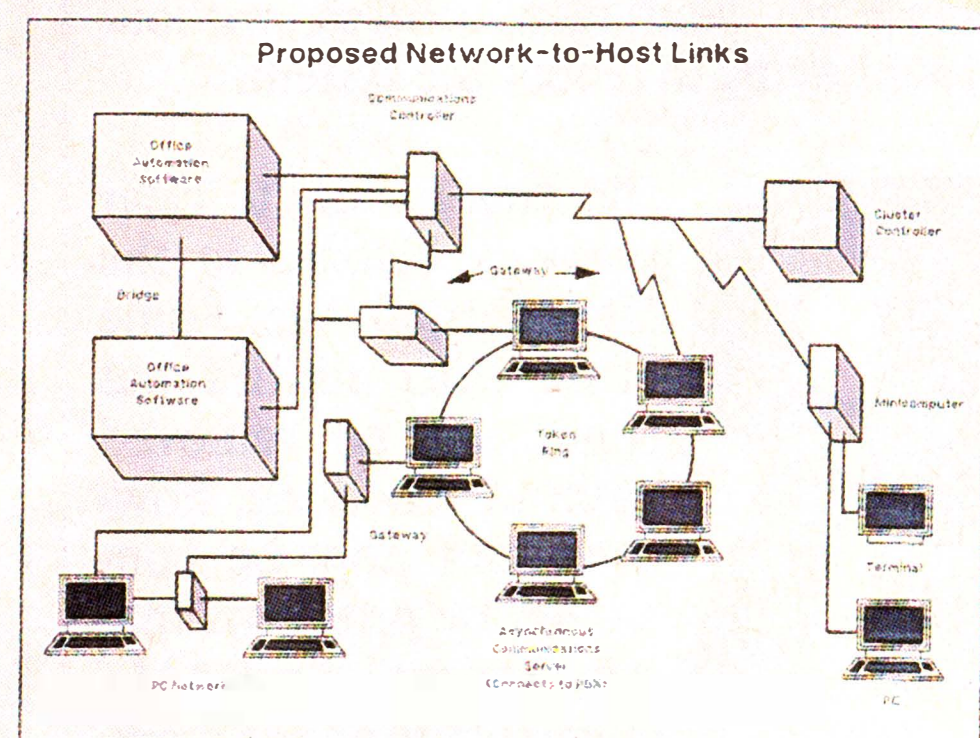
From the Desk of
Jonathan Smith
Manager, ESD Division

PRIORITY	ITEM	RESULTS
1		
2		
3		

NOTES

Activity Planner **NOVEMBER**

SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
	1	2 Site Prop.	3	4	5	
6	7 Tokyo	8	9	10	11	12
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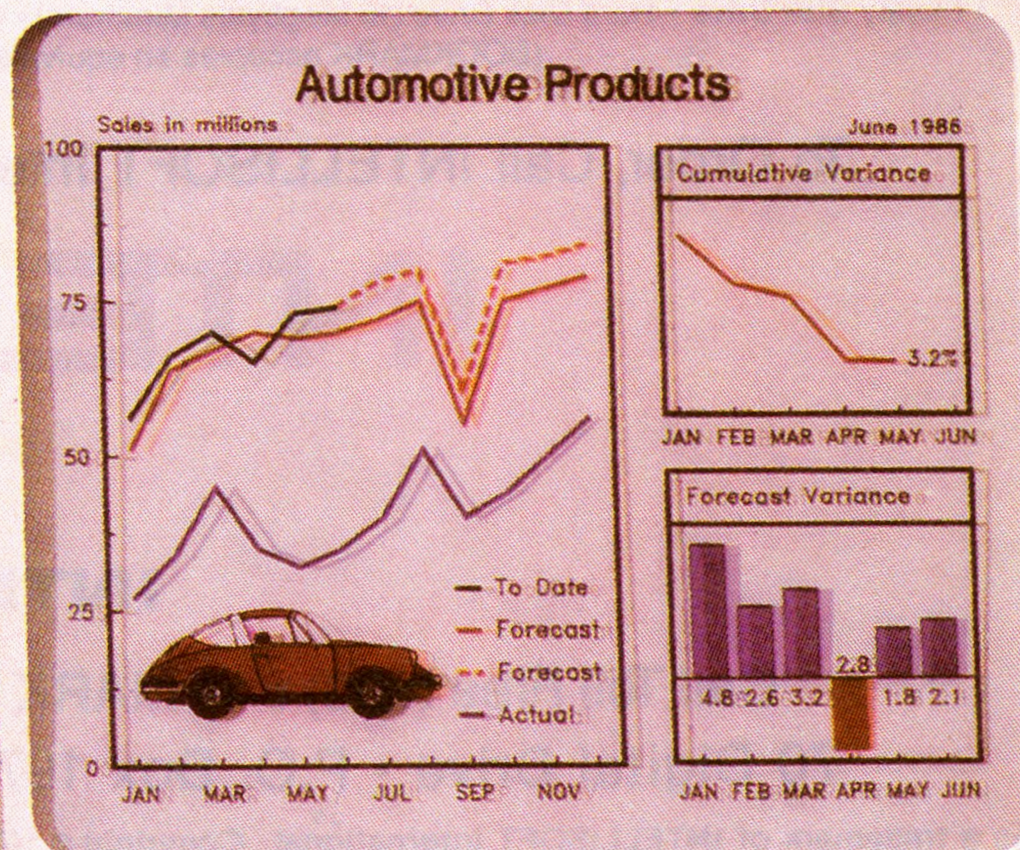
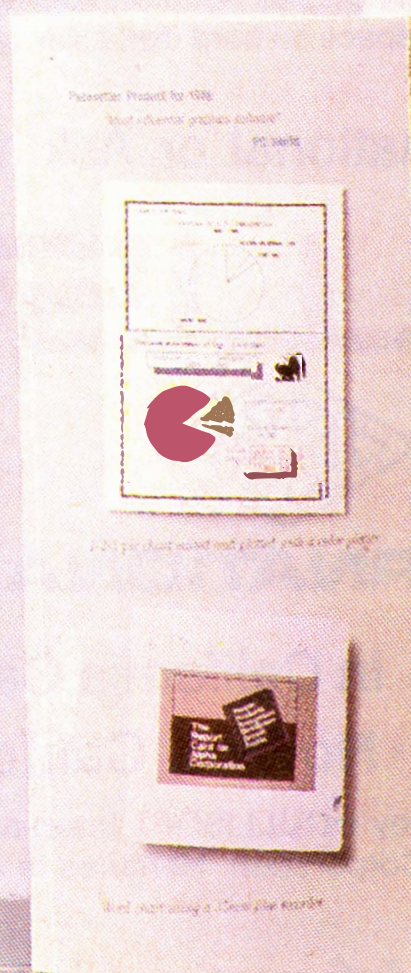
TYPEWRITER
KEYBOARD

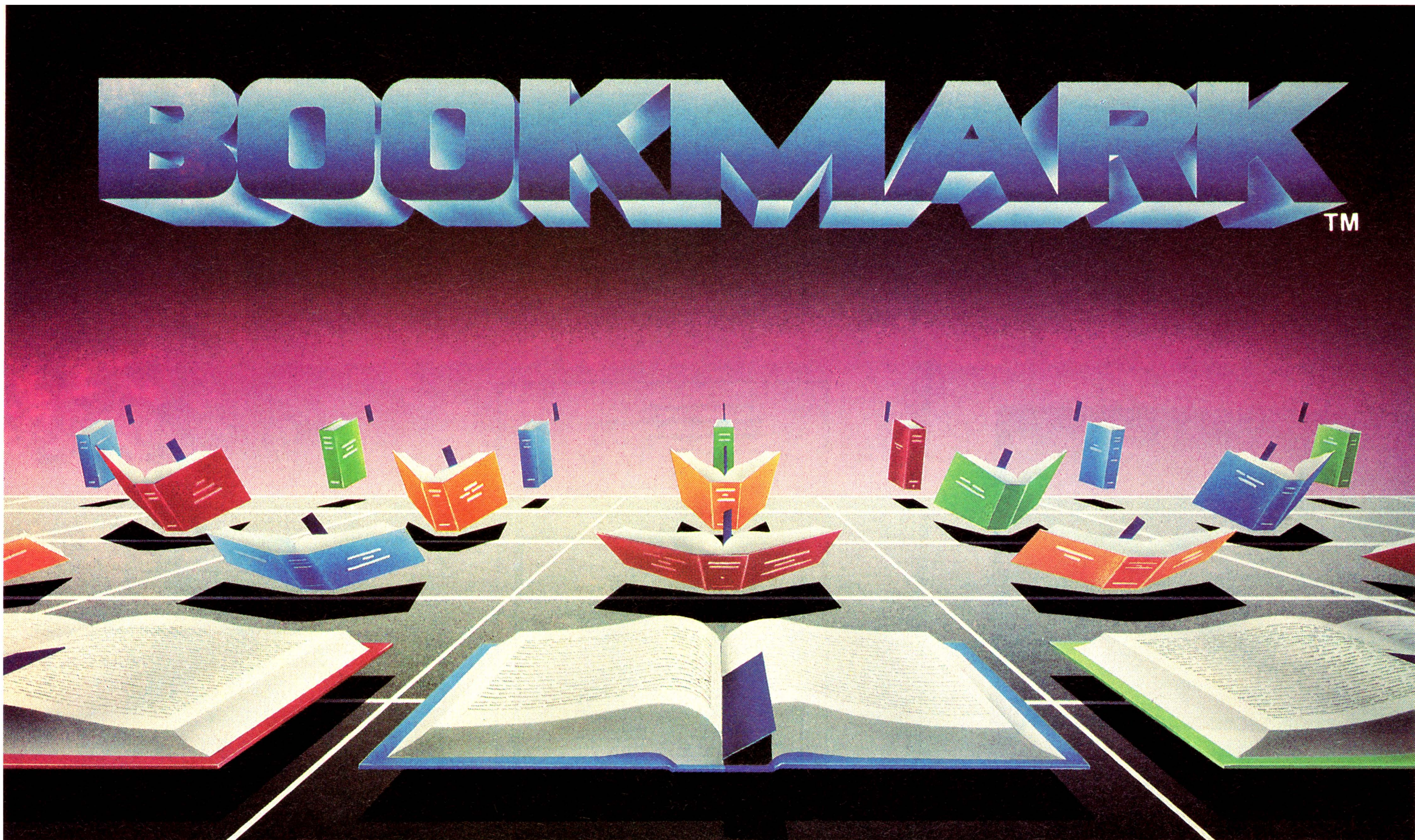
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(For More Information Circle 7)

PERFORMANCE

HOW WELL DO YOU SPELL?

Spelling checkers can ensure your text is letter perfect, but not all are created equal.

by Steve Ditlea

OK, pick up your pencils and circle the misspelled words in the following list: embarrass, accommodate, supersede, precede, susceptible, Mediterranean, recommend, omission, minuscule, and perceive.

Now for the bad news: All the words above are spelled correctly. That list of 10 commonly misspelled words should tell you something: The English language isn't easy. And all the mnemonic sayings in the world won't help when you need to know the definitive spelling of a word before you submit a

proposal to the boss; nothing detracts from a business letter as does a misspelling.

That fact accounts for the proliferation of spelling checkers. Within just a few years, personal computer spelling checkers have gone from exotic add-on programs to standard features in word processing packages. The latest wave of word processor upgrades confirms this: Such former holdouts as Volkswriter and PC-Write have recently added spelling correction. (Only XyWrite

Steve Ditlea has written about and used word processing programs since 1980.

III remains spelling checker-less among major word processors.) With hard disks now on more than half of all MS-DOS computers, large amounts of available storage will accelerate the trend toward the use of spelling checkers.

The popularity of these electronic proofers has developed so quickly that few users have had the chance to become familiar with different programs, whether built into word processors or as stand-alone programs. Then again, the publishers of a \$495 word processing package may not be keen on your finding out that the word list for their spelling checker was originally culled from such romance novels as "Destiny's Mistress" and "Teach Me To Love," or that one widely used word base for U.S. English was actually compiled in Belgium. Even when the source of a disk-based dictionary is a standard reference work like *Webster's Ninth New College Dictionary*, and many word processors use the same spelling checker, the actual implementation can vary widely.

Not that differences among spelling checkers may matter if you're already experiencing the productivity increases and quality control benefits of computerized dictionary software. "Spelling checkers are a necessity in my business," says Garattan Gray, president and general manager of the *Monroe* (Michigan) *Evening News* (published six times per week, with a circulation of 27,000). Newspaper recruits have changed since the days of "The Front Page": "Reporters have become far worse spellers over the years," says Gray. "Everyone we hire has to take a copy editing test: It used to be that a score of 85 was passing; no one in the last 10 years has gotten over 70."

Gray compensates for this with Borland International's Turbo Lightning on the eight Zenith 148 (IBM PC-compatible) dual-floppy desktop systems serving the editorial staff. That package includes an electronic version of the *Random House Dictionary* and *Random House Thesaurus*, along with Desk Plus desk management software and a customized word processing package. Gray recalls: "After a few weeks, my city editor told me that he was saving a half hour a day by not having to correct copy. The reporters' spelling continues to improve from seeing the corrections on their screens."

Turbo Lightning was the first to offer spelling correction while you typed—beeping when you misspelled a word—

but most reporters have turned off this feature, preferring to check their documents a screen at a time. For his own writing, which consists mostly of correspondence and departmental memos, Gray uses a word processing program built around another real-time spelling checker, Airus, Inc.'s, Write Now. Not that he wouldn't catch misspellings himself ("I'm a better speller than any secretary I've ever had"), but he likes the insurance factor of having his work double-checked by the computer.

It's hard to imagine that before this decade, the notion of a computer checking everyday writing for spelling errors was largely science fiction. A few main-frame and minicomputer utilities could check program code for misspellings, and dedicated word processors were beginning to offer spelling checkers, but at a minimum of \$7,500 for such a system, only larger organizations could afford them. Later, in 1980, along came Spellguard, the first personal computer program to offer an electronic spelling dictionary—for users of the CP/M operating system then prevalent.

"People laughed when I predicted that soon no word processor would be sold without a spelling checker," recalls Dennis Coleman, author of Spellguard, which later became the first spelling checker for MS-DOS computers. He started writing Spellguard after several readings of a report by his associates failed to pick up what turned out to be embarrassing misspellings.

Coleman compiled a 20,000-word dictionary file against which his Spellguard checked spellings. Unfortunately, the word "misspelling" was one of the many incorrectly spelled words in it. But Coleman's product demonstrated that by using compression techniques to reduce the space taken up by word lists, you could store a useful dictionary on the limited-capacity media of early-day personal computers.

Any spelling checker is only as good as the contents of the dictionary on which it's based. Though used in word processing, spelling checkers are actually specialized data management applications, with a disk-based dictionary serving as the data base and a detect-and-compare program, called an "engine," that powers the search. The program compares the words within a document or on a text screen to the contents of the dictionary file; it considers any mismatches misspellings and flags them on your personal computer display.

Selected Spelling

PRODUCT/Company

MS-DOS Word Processors

DisplayWrite 3 IBM; 100 Summit Ave., Montvale, NJ 07640; (201) 358-5689 (Circle 380)

MultiMate Advantage 3.06 Ashton-Tate; 20101 Hamilton Ave., Torrance, CA 90502; (213) 329-8000 (Circle 387)

Office Writer 5.0 Office Solutions, Inc.; 2802 Coho St., Madison, WI 53713; (608) 274-5047 (Circle 388)

PC-Write 2.71 Quicksoft; 219 First N #224, Seattle, WA 98109; (206) 282-0452 (Circle 389)

PFS: Professional Write Software Publishing Corp.; 1901 Landings Dr., PO Box 7210, Mountain View, CA 94039; (415) 962-8910 (Circle 390)

Word 3.1 Microsoft Corp.; 16011 NE 36th Way, Box 97017, Redmond, WA 98073; (206) 882-8080 (Circle 396)

WordPerfect 4.2 WordPerfect Corp.; 288 West Center St., Orem, UT 84057; (801) 227-4020 (Circle 398)

WordStar Professional 4.0 Micropro Intl. Corp.; 33 San Pablo Ave., San Rafael, CA 94903; (415) 499-1200 (Circle 399)

Write Now 1.4 Airus, Inc.; 10200 S West Nimbus Ave., Suite G-5, Portland, OR 97223; (503) 620-7000 (Circle 400)

MS-DOS Stand-alone Programs

The Reference Set 2.04 Reference Software; 330 Townsend St., San Francisco, CA 94107; (415) 541-0222 (Circle 413)

Turbo Lightning 1.02 Borland Intl.; 4585 Scotts Valley Dr., Scotts Valley, CA 95066; (408) 438-8400 (Circle 414)

Webster's NewWorld Spelling Checker 1.04 Simon & Schuster Computer Software; 1 Gulf & Western Plaza, New York, NY 10023; (212) 373-8133 (Circle 409)

Mac Word Processor

Word 3.0 Microsoft Corp.; 16011 NE 36th Way, Box 97017, Redmond, WA 98073; (206) 882-8080 (Circle 409)

Mac Stand-alone Programs

MacGas 2.0 Enterset; 410 Townsend St., San Francisco, CA 94107; (415) 543-7644 (Circle 381)

MacLightning 2.0 Target Software; 14206 SW 136 St., Miami, FL 33186; (305) 252-0892 (Circle 382)

MacProof 2.0 ALP Systems; 190W 800N, Provo, UT 84604; (801) 375-0090 (Circle 404)

MacSpell+ 1.67 Creighton Development, Inc.; 16 Hughes St., Suite C-106, Irvine, CA 92718; (714) 472-0488 (Circle 405)

Spellswell 1.3 Greene, Johnson, Inc.; 321 Alvarado St., Suite H, Monterey, CA 93940; (408) 375-2828 (Circle 407)

Thunder 1.1 Batteries Included; 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5; (416) 881-9941 (Circle 408)

Checkers Compared

DICTIONARY SOURCE	WORD SIZE OF DICTIONARY	WORDS IN USER DICTIONARY	MEMORY REQUIREMENT	ALGORITHM	SUGGESTS CORRECTIONS	DICTIONARY MODE	PRICE	NOTES
Proprietary	125,000	500 per dict. Unlimited dicts.	310k-314k	Phonetic	Y	Batch/ interactive	\$495	
Webster's Ninth New Collegiate Dictionary	110,000	Unlimited	320k	Pattern match	Y	Batch/ interactive	\$595	Includes 30,000 legal and medical terms.
Webster's Ninth New Collegiate Dictionary	80,000	Unlimited	256k	Phonetic/ pattern match	Y	Batch/ interactive	\$495	Free legal and medical dictionaries on request.
Proprietary	50,000	5,000-6,000	320k	Phonetic	Y	Batch/ interactive	\$89	
Proprietary	77,000	5,000 per dict; Unlimited dicts	320k	Pattern match	Y	Batch/ interactive	\$199	
Proprietary	80,000	5,000-7,000 per dict. Unlimited dicts.	256k	Pattern match	Y	Batch/ interactive	\$450	
Proprietary	115,000+	Unlimited	256k	Phonetic/ pattern match	Y	Batch	\$495	
American Heritage	87,000	1,500 per dict. Unlimited dicts.	256k	Phonetic	Y	Batch/ interactive	\$495	
Proprietary	35,000	Unlimited	384k	Pattern match	Y	Batch/ interactive	\$150	
Random House	133,000	Unlimited	128k	Pattern match	Y	Batch/ interactive	\$89	Includes a thesaurus.
Random House	83,000	Unlimited	128k	Phonetic	Y	Batch/ interactive	\$99.95	Includes a thesaurus.
Webster's NewWorld Dictionary, 2nd Ed.	114,000	Unlimited	256k	Phonetic/ pattern match	Y	Batch	\$150	
Proprietary	80,000	Unlimited	512k	Phonetic/ pattern match	Y	Batch/ interactive	\$395	
Proprietary	80,000	Unlimited	512k	Pattern match	Y	Batch/ interactive	\$99	Includes a thesaurus.
Webster's Ninth Ed.	80,000	Unlimited	512k	Phonetic/ pattern match	Y	Batch/ interactive	\$99.95	
Webster's	93,000	5,000 per dict. Unlimited dicts.	1Mb	Verifier only	N	Batch	\$195	Checks style, punctuation, capitals.
Proprietary	75,000	Unlimited	512k	Pattern match	Y	Batch/ interactive	\$99	Includes a thesaurus.
Proprietary	153,000	Unlimited	512k	Verifier only	N	Batch	\$74.95	Includes a homonyms dictionary.
Proprietary	50,000	Unlimited	512k	Pattern match	Y	Batch/ interactive	\$49.95	

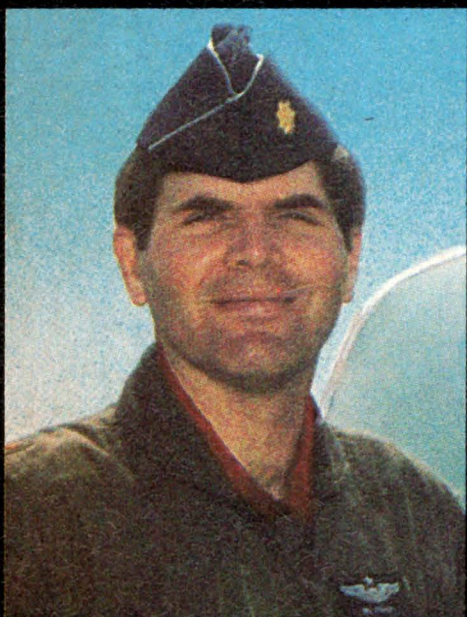
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COMPARE —

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COMBAT AREA	7 REAL MISSIONS—LIBYA TO THE PERSIAN GULF	2 SMALL FICTITIOUS FLYING AREAS
COCKPIT	SOPHISTICATED NAVIGATION MAP, MULTIPLE RADAR AND WEAPONS DISPLAY	TWO LINES OF TEXT
ACTION	MULTIPLE MISSION OBJECTIVES AND THREATS	PICK ONE MISSION OR ONE SET OF THREATS
VALUE	GREAT VALUE—(HUNDREDS OF HOURS OF PLAYTIME)	OVERPRICED

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F-15 STRIKE EAGLE is for Commodore 64/128, Atari 800/XE/XL series, Apple II+ family, IBM PC and PC JR computers for a suggested retail price of only \$34.95. Call or write for more information or Money Order, MC/Visa orders. Add \$2.50 for shipping and handling.

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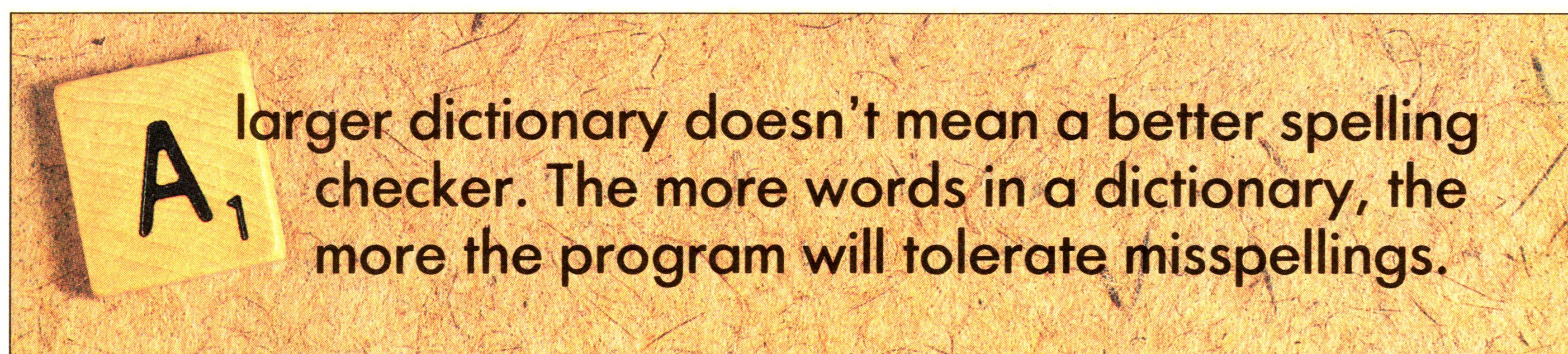
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(For More Information Circle 51)



One critical element to the utility of dictionaries is their base lists; word lists should fit the usage and style of the document to which you will apply them. Coleman's original spelling checker emphasized business terms, since it grew out of his work as a consultant for the government.

Another early spelling checker, *The Word*, also preserves its origins in its dictionary. Software pioneer Wayne Holder's wife wrote romance novels on an early IMSAI computer. Holder's experiments in compressing her manuscript files for easier storage resulted in a dictionary of 40,000 words, augmented with useful terms from beyond the valley of the bodice shredders. Now up to 60,000 words and counting, *The Word Plus* is the spelling checker in Symantec's *Q&A*, *Bank Street Writer Plus*, and *Microsoft Word* (MS-DOS only; the Mac version uses a different spelling checker—see below).

Until *The Word Plus*, all spelling checkers were *verifiers*, flagging words not found in their dictionary lists. This program was the first *corrector*—one offering alternative words with correct spellings. Now all of the checkers offer alternate spellings and most display misspelled words in context. *The Word Plus* also established the now-standard options of accepting a suggested spelling, typing in another spelling, adding the flagged word to a user dictionary, or ignoring it and going on to the next misspelling.

The Word Plus, still available in a stand-alone package from Software Heaven, Inc., in San Diego, was put through its paces as the *Spell* program in *Microsoft Word* version 3.1. The spelling checker, which you can use while editing a document (called interactive mode) or after you finish writing a document (batch mode), was tested on a letter filled with traps for various weaknesses in spelling checker programs (see sample letter). In batch mode (invoked by typing in *SPELL* at the DOS prompt), the program took 40 seconds

to check the letter and indicated 21 unknown words out of a total of 181 words. It offered correct spellings for "colaborate" and "overacheiver," but gave "ht" as a correction for "the" misspelled as "hte" and failed to suggest spellings for "autobiografy" as well as "skizofrenik."

Word 3.0 for the Macintosh (in a prerelease version we worked with) uses Soft-Arts' 80,000-word Multilingual Spelling Verification/Correction Program dictionary as its base. Soft-Art is a multinational company founded in Belgium—hence its American English dictionary compiled far from U.S. shores at the University of Louvain outside Brussels. This hasn't prevented Soft-Art's speller from making inroads in the U.S.; it is also packaged with PFS:Professional Write, Samna Word IV, and Volkswriter 3.

You can create as many user dictionaries with the program as you like, limited only by your disk space. You activate the checker with a pull-down menu or by hitting Command-L. *Word* for the Mac checks an entire document, a selection (a sentence, a paragraph, or a number of paragraphs), or a single word.

Word flagged 22 errors in our test document and suggested 14 correct spellings and four incorrect spellings. It failed to cite 16 other errors including the lowercase "i." In addition, *Word* missed the repeated word "over," but was among the only programs tested to suggest the correct spelling for "skizofrenik." *Word* also scored a hit on the correct spelling of "niether," and offered "knitwear" as its second alternative.

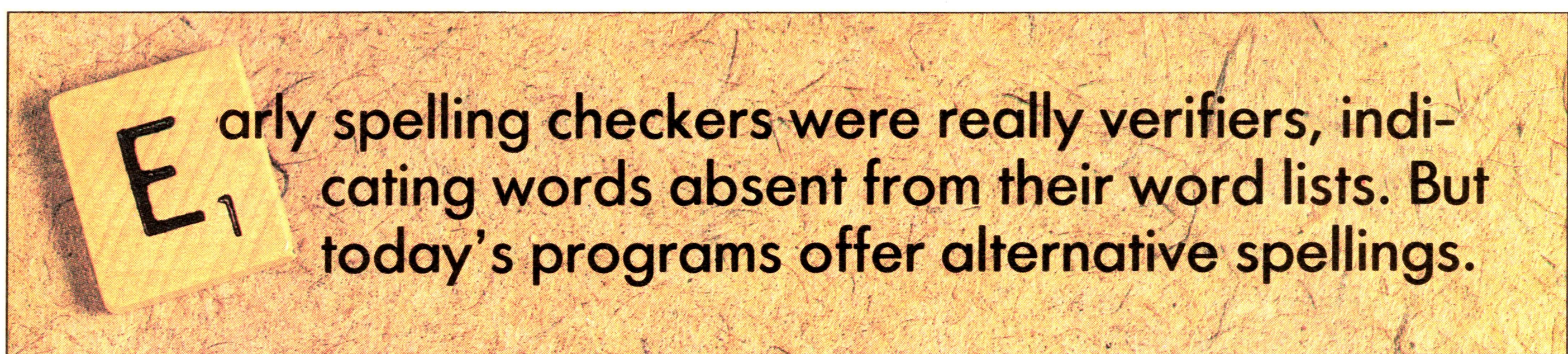
"A spelling corrector is a true artificial intelligence application," explains Henry Kucera, professor of linguistic and cognitive sciences at Brown University. "It must simulate human behavior, taking into account phonetic misspellings and anticipating human errors." By adding linguistic rules to a spelling corrector he designed, Kucera boosted the accuracy of suggested spellings to over 80 percent on the first try. His work earned a patent for The Houghton Mifflin Spelling Corrector, now li-

censed to over 30 office automation manufacturers and best known as *CorrectStar*, the spelling corrector in MicroPro International's *WordStar*, *WordStar 2000*, and *Easy*.

CorrectStar includes an 87,000-word dictionary based on the *The American Heritage Dictionary* (published in hard cover by Houghton Mifflin). The current word list is up from 67,000 in previous versions of the spelling checker, but don't look for word counts to keep escalating. Recent independent research shows that a dictionary beyond the 60,000-80,000-word range may be self-defeating. The reason is that as you add words, the number of permissible words and their permutations increases, and you'll therefore see fewer misspellings noted. "A bigger dictionary doesn't necessarily mean a better one," Kucera comments. "Often it can be less accurate in finding misspellings. For instance, if you have obscure words like 'calender' and 'embar' [in a dictionary program], you could miss incorrect spellings of 'calendar' and 'ember.'"

Houghton Mifflin optimized the words in the *CorrectStar* dictionary according to Kucera's studies of word usage. In 1967, he published the first computer-generated list of frequently used U.S. English words, a reference work known as *The Brown Corpus*. Among his findings: "the" is the most written word, accounting for 7 percent of all usage; "of" and "to" come in at number two (with "of" more common in technical writing) and the most frequently misspelled word is "from." No spelling corrector will flag its usual misspelling, "form," because it's a valid word—and that includes Kucera's program, run in *WordStar Professional* release 4.

Unlike previous versions of *WordStar*, which invoked *CorrectStar* from the opening menu, MicroPro's newest release checks spelling during editing. Separate commands let you check an entire document, the word at the cursor, or a word typed in. *CorrectStar* was the most selective of the spelling checkers



we found, flagging 30 misspellings with the test letter, including “self-taut” and “puting” (not spotted by The Word), though it mistakenly designated as misspellings “remap,” “peace-of-mind,” “start-up,” “John” (suggesting “Join”), and “Joan” (suggesting “John”). It did offer correct spellings for “autobiography” as well as “skizofrenik,” and provided appropriate alternatives for “hte” (“the”) and “worts” (“words”). One blind spot was its inability to suggest the correct spelling for “synonym.”

As with other applications, improving a spelling checker involves juggling limitations in hardware and software. “There’s always a tradeoff between speed and size,” says Peter Yanilos, president of Proximity Technology, Inc., publisher of one of the most used spelling checkers, licensed to over 60 manufacturers and included in Framework II, Symphony, Manuscript, MultiMate Advantage, and Office Writer 5.0. Because of design tradeoffs in allocating internal memory and disk space, the speed of the Proximity Linguistic System in various word processors can differ by a factor of two to three, according to Yanilos. Also peculiar to each package is how the same spelling corrector operates; for instance, Framework II can check spellings in spreadsheets and data base files while rival Symphony can check spelling only within word processing documents.

Proximity lays claim to having one of the most effective compression systems, squeezing over 80,000 words from *Webster’s Ninth New Collegiate Dictionary* (published by Merriam-Webster) into about 220k of disk space (roughly three-fourths the space CorrectStar’s similarly sized word list requires). It also compresses user-created dictionaries of specialized words not found in the main dictionary—allowing individual files of 10,000 words apiece (as opposed to CorrectStar’s 1,500 words each). The same compression technology is about to make possible a full computerized definition dictionary in 1Mbyte of storage for hard disk systems—also from Proximity.

Denser dictionaries alone can’t guar-

antee a more accurate spelling checker, however. The programs need improved rules, or algorithms, to recognize correctly spelled words even if they don’t match what appears in the dictionary. “It’s important to strike a balance,” says Yanilos. “No rule-based system is perfect.” Proximity’s detection algorithms analyze capitalization, contractions, hyphenated compounds, prefixes and suffixes, and the use of the same word twice in a row.

Proximity’s performance varies in tests of the interactive spelling checkers in MultiMate Advantage and Office Writer 5.0. In our letter, MultiMate spotted 23 misspelled words (flashing their first letters on-screen all at once), while Office Writer found 28 errors (highlighted one at a time as you scroll through the file) including “puting” and “self-taut”—unnoticed by the former program. Office Writer picked up the repetitious word “over,” even though MultiMate did not. One explanation for the disparity: MultiMate Advantage 3.06 added an extra 30,000 legal and medical terms to its word list, making it more tolerant of misspellings.

The Proximity spelling checker is designed to work with dictionaries in seven languages, though detection and correction algorithms differ from language to language. Even more versatile is Soft-Art’s spelling program, with dictionaries in 11 languages.

It’s difficult to get an accurate count of Soft-Art’s word list since it comprises root forms meant to be matched to words stripped of their suffixes. In this way, Soft-Art can verify over 130,000 different words using 60,000 root words (though it may also accept as correct words that don’t exist at all). User dictionaries are usually limited in size only by disk space. In addition, word processor publishers have added their own words; for example, Volkswriter claims a list of 170,000 words, making its spelling checker what’s called “the most complete available.”

As we’ve seen, when it comes to dic-

tionaries, bigger isn’t necessarily better, so the Soft-Art spelling checker was put to the test in PFS: Professional Write, with its more typical 77,000-word dictionary. The results were commendable: finding 25 misspellings in the sample letter, this interactive spelling checker (easily invoked from the menu at the top of the screen with F5 for “dictionary,” followed by the choice for “proof document”) was one of the few to spot “fo” (though it suggested “foe” instead of “of” as the correct spelling), signal the repeated word “over,” and offer “York” as the correct form for the misspelled “Yrok.”

Compiling a spelling list at an academic institution, as Soft-Art did, may have its advantages. WordPerfect Corp. also created its 115,000 word WordPerfect spelling dictionary this way, at Brigham Young University, near the company’s Utah headquarters. Like Soft-Art’s, WordPerfect’s spelling corrector (awkwardly invoked with Ctrl-F2, followed by menu choices for checking a word or a document) made a minimum of erroneous calls, finding 22 misspellings (highlighted in turn) in the test letter and easily catching and suggesting correct alternatives to such potential traps as “Yrok,” “fo,” and “hte.” One unique feature of WordPerfect’s spelling checker is its algorithm that suggests word corrections—it pattern-matches characters (matching and rejuggling the letters in a word) or, if you find the words presented unsuitable, you can press a key to bring up alternative spellings based on phonetic approximations of the word. This spelling checker showed an odd characteristic: It gave the same suggested spelling twice for such words as “collaborate,” “misspelling,” and “overachiever.” On the other hand, it did spot the duplicate use of “over” and it was only one of four spelling checkers tested that offered the correct spelling for “Volkswagon.”

Another successful word processing package, PC-Write, went the academic route for its spelling dictionary, using a 50,000-word list from lexicographer Bruce Womblor, a professor at the University of New Mexico. Again, as in

WordPerfect, PC-Write's spelling engine was authored in-house. There the similarity ends: After all, this program is sold as shareware, with version 2.7's two disks available for \$16 and a fully documented copy for \$89 (instead of WordPerfect's \$495).

Unfortunately, the performance of PC-Write's correction algorithms leaves much to be desired. While it did work up to par in flagging (in inverse video) 21 misspellings in the test letter, its suggested corrections were unsatisfactory: "colander" for "colaborate," "putrefy" for "puting," and "sympathetic" for "symonym." (According to author and publisher Bob Wallace, PC-Write version 2.71 will include phonetic algorithms for better matches.) Aside from this, PC-Write's spelling checker is well designed, automatically loading its 110k dictionary into memory when first invoked (with Alt-F5 from the editing screen) to save on time-consuming disk accesses. It can also check a word as you type it in, beeping to indicate its absence from your word list.

The first word processor to offer real-time checking of spelling as you typed was AI Typist from Airus, Inc., now upgraded as Write Now. Jay Eisenhower of Airus admits that 95 percent of users turn off the annoying beep in real-time checking, but claims that the same Airus technology is useful in "clairvoyance," the program's ability to complete words automatically after you type in a few characters, and "spell guard," a feature that you can toggle to keep misspelled words from appearing on-screen during typing. Airus claims that Write Now's spelling list of 35,000 words was compiled with the business professional in mind.

How good is its spelling checker? Not very. In interactive mode, Write Now highlighted (in glaring fuchsia) a whopping 38 misspellings in the test letter, including such correct words as "thesaurus" and "savvy." Its algorithms are obviously limited to alphabetically matching words, with no recognition of transpositions or phonetic mistakes. Its suggestions (which pop up in a window at the push of Ctrl-Enter) are in strict alphabetical order so that the first suggestion for "overacheiver" was "overall" and the first alternative to "symonym" was "sydney," followed by over 50 more possibilities that scrolled alphabetically until the correct spelling appeared.

IBM, instead of trying to score innovative "firsts" with its personal comput-

er software, is known for using proven technology. The spelling checker capability in DisplayWrite and Writing Assistant packages is no exception. Based on the Word Proof stand-alone spelling checker originally released in 1983, this module in both word processing packages features a 125,000-word dictionary culled by an IBM development team in Maryland. The actual implementation differs slightly: In Writing Assistant, a user dictionary is limited to 8,000 characters, while in DisplayWrite, you can develop an unlimited number of personal dictionaries of 4,500 characters each. In addition, DisplayWrite users can order lists of legal jargon (16,000 words) and medical terms (79,000 words) from IBM.

The DisplayWrite 3 user can invoke IBM's spelling checker from within the text area simply by pressing F9, or from the program's bar menu by selecting the Spell option followed by Check Document. (Other choices are for checking a word or page.) You can use the spelling

feature in interactive mode by selecting the "prompted" option, while "automatic" mode highlights an entire document batch-style for subsequent revision. Another handy feature: special characters you can insert into text to omit words like foreign expressions or technical terms from a spelling check.

When checked with our test letter, DisplayWrite 3 indicated 27 unknown words. It gave correct spellings for 10 of them. It had particular trouble with hyphenated words: it flagged "start-up" and offered "stratum" as the first alternative, and noted the correctly spelled "peace-of-mind" and "one-hundred-per-cent," but gave no alternatives. It did, however, catch "self-taut" and provide the correct spelling.

DisplayWrite also caught "fo," but offered "Fe" and "FL" as alternatives. It also flagged "hte," but gave "hate" as

Words That Fail You

Our sample letter contains 19 misspellings, obscure words ("fro" and "worts"), proper nouns, and words misspelled in context.

Joan K. Doe
2 Lincoln Plaza
New Yrok, NY 10023

John Q. Famous
1311 Blueview Terrace
Bonney Lake, WA 98390

Marck 12, 1987

Deer Ms. Doe:

As I look out form my house, I can't wait to colaborate on our new start-up. Puting together my autobiografy fro publication will give me peace-of-mind. To a guy from the wrong side fo hte tracks by Stanford, this book makes me feel like a overacheiver all over over again.

Because I am self-taut, you sea I talc beter then I right. That's why I depend on a spelling checker too spot my misstakes and misspellings. I Also like to use an electronic thesaurus fro finding beter worts. But do i rilly need a symonym for Volkswagon? Are enough business terms in the dictionaries? How about sport(s) terms? Will I find "stadium" or "aria" or "schmaltz"?

Of course, nun of these programs is one-hundred-per-cent perfect. Than again niether am I. That's why I need your public relations savvy to remap my skizofrenik story and take the world by storm. Go fro it!

Cincerlly,

The Product Market

Physical Attributes of Market

- Size of market
- Geographic location
- Demographic description of purchasers

Behavioral Characteristics of Purchasers

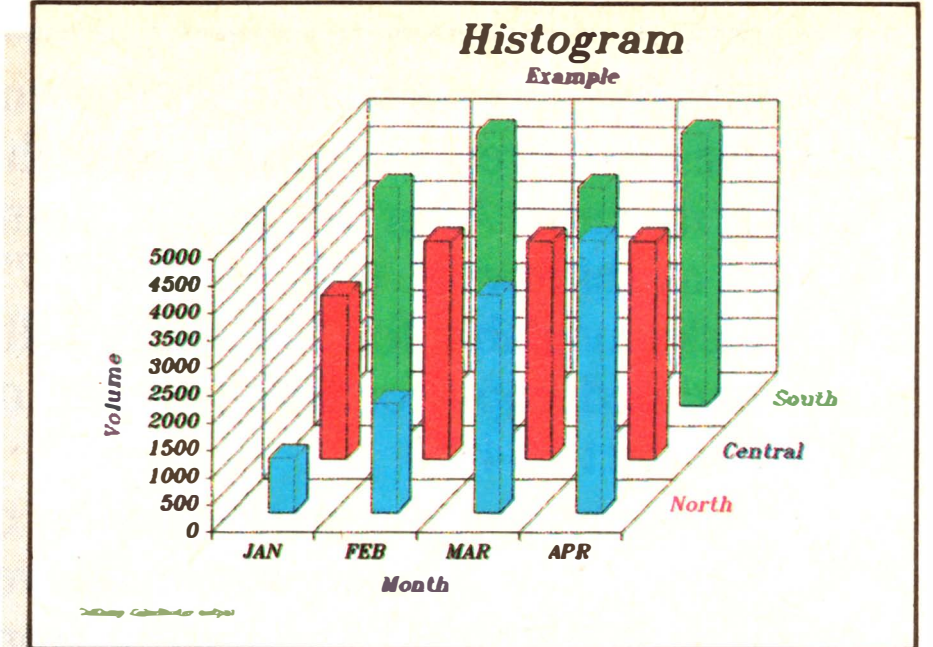
- When purchases are made
- How buying is done
- Purchasing influences

Sign-Master by Decision Resources

MARKET GROWTH

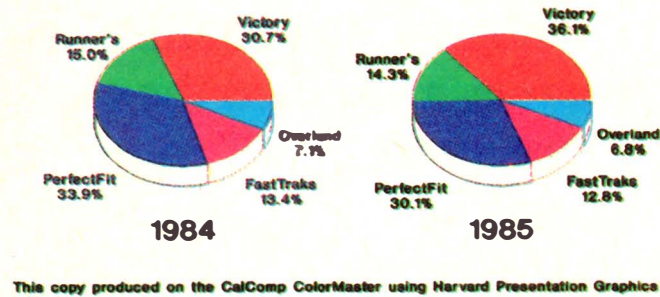
FISCAL	INDUSTRY RETAIL SALES (UNITS)	INCREASE VERSUS PREVIOUS YEAR
1982-83	8,523	16.3%
1983-84	9,980	17.1%
1984-85	11,870	18.9%
1986-87	14,244	20.0%
1987-88	18,193	27.7%

Diagram-Master by Decision Resources

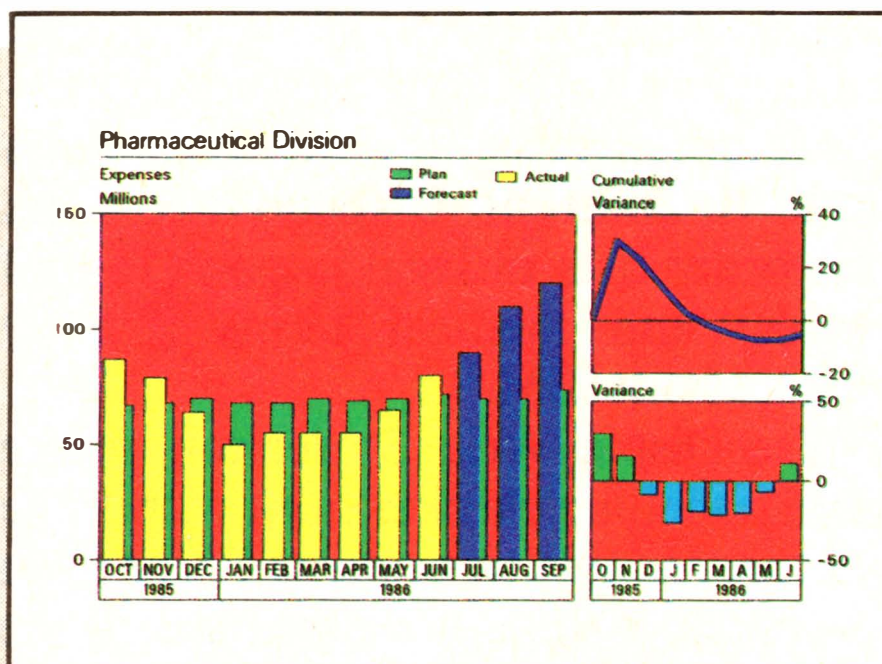


The Smart Series by Innovative Software

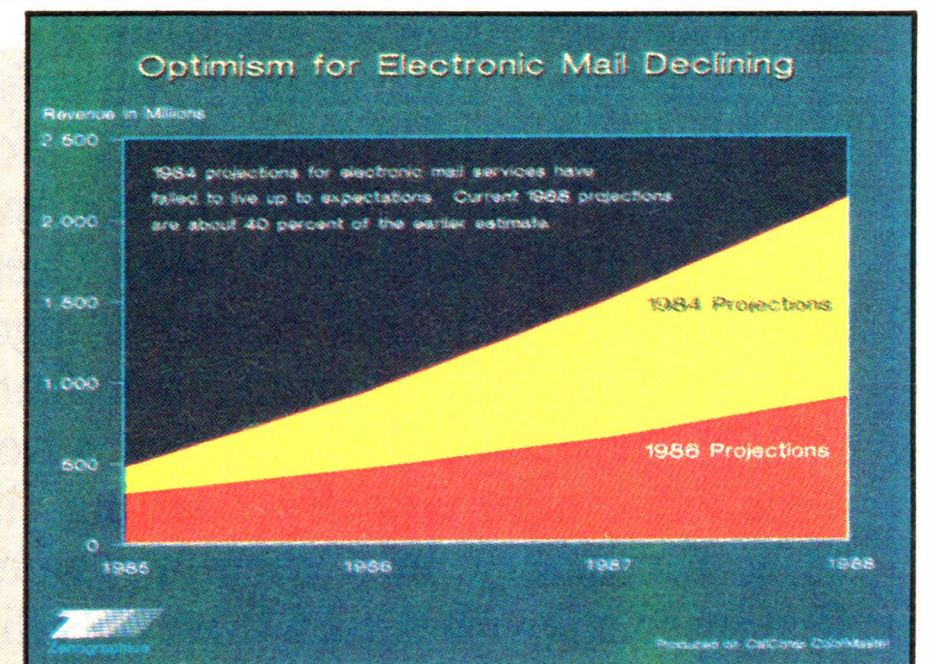
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(For More Information Circle 68)



Some spelling checkers have ignominious origins: Consider those culled from newspaper articles or "Destiny's Mistress," a romance novel.

the first alternative without citing "the." The checker cited "rilly," but failed to offer "really"; it also gave no alternative for "Volkswagon." DisplayWrite highlighted the properly spelled "schmaltz," too. It flagged "skizofrenik" but gave no alternative and suggested "Cancerously" as the first alternative to "Cincerlly," never listing "Sincerely." Display Write didn't flag remap, however.

For word processing users happy with their current software who'd like to add a spelling checker, three major rivals vie for attention among stand-alone MS-DOS programs. The Simon & Schuster Webster's NewWorld Spelling Checker claims the most words in its base dictionary—more than 114,000 from *Webster's NewWorld Dictionary* (Second Concise Edition). Webster's NewWorld is also the only such program to incorporate over 15,000 common misspellings from a misspeller's dictionary. The same batch mode spelling checker is also part of Webster's NewWorld Writer word processor. Among its handy features: a preview mode that lists all incorrectly spelled words for quick editing or addition to an auxiliary dictionary (with room for about 3,000 words) and a choice of four different levels of scanning for alternative spellings. (You can adjust the comprehensiveness of dictionary searches from 400 to 3,000 words, depending on how fast you want the program to operate.)

Webster's NewWorld Spelling Checker (compatible with ASCII files and 11 top word processors) has one of the best organized displays, with separate windows for text, prompts, commands, and alternate spellings. It highlighted in yellow 21 questionable words in our test letter, picking up such traps as "puting" and "fo," though its first suggestions of "punting" and "foe" were not too helpful. The fact that it offered as the correct form of "colaborate," not just "collaborate," but also "collaborated," "collaborates" and "collaborator"

attests to Webster's storing all plurals and derived words in its dictionary instead of relying on algorithms to generate these from root words. Thus it has fewer different words than billed, but is also more accurate than most spelling checkers. It could use improved phonetic checking, though, because it failed to find a correct spelling for "skizofrenik" and offered such off-the-mark suggestions for "Cincerlly" as "Cancel," "Cancer," and "Sincerity," but not "Sincerely."

The other top add-on spelling checkers, offered in The Random House Reference Set and Borland's Turbo Lightning, use identical dictionaries, culled from the *Random House Dictionary* (Concise Edition). These are provided in 50,000- and 80,000-word files, to be used depending on internal memory, and floppy, hard, or RAM disk installations. Just how differently the same dictionary performs with competing engines was demonstrated by a direct face-off of the two programs.

You can use Reference Software, Inc.'s, Reference Set as an interactive spelling checker from within any of a dozen major word processors or as a batch checker by using the supplementary program Refspell. In batch mode, it was surprisingly slow with the brief test letter, taking over a minute and a half to flag 27 doubtful words, including such acceptable hyphenated words as "one-hundred-per-cent" as well as "peace-of-mind." It was also a truly sexist spelling checker, one of only two tested here to take exception to "Ms." On the other hand, when loaded as a memory-resident spelling checker, Reference Set was among the fastest, with a 1,200-word subset dictionary stored in memory usually responsible for recognizing 82 percent of the words used in the text.

With its biggest dictionary, the Reference Set's speller was far from the mark in suggesting correct spellings: for "hte" it gave "how-to" and "howdah," while for "colaborate" it offered "cola" and "colander" before coming up with "collaborate" and eight other forms of the word. If this corrector weren't so inade-

quate, some suggestions would even be comical; for "overacheiver," it displayed 25 incorrect alternatives beginning with "ovaries" and "overabundance." Still, it was one of the spelling checkers to offer the correct spelling of "Volkswagon," as did Turbo Lightning.

Starting with the same Random House dictionary licensed from Wang, the owners of the electronic rights, Borland International wrote an engine for Turbo Lightning with more sophisticated pattern-matching and phonetic algorithms than Reference Set. Among the improvements in the latest revision, version 1.02, is an algorithm for recognizing possessives. But the engine's real-time mode, beeping or flashing as you type an incorrect word, and interactive use limited to checking no more than a screen at a time, can drive you to distraction at times. It also takes some getting used to when WordStar version 4.0's function key prompts at the bottom of the screen are flagged by Turbo Lightning's proofer for such misspellings as "Underlin" and "Del Word."

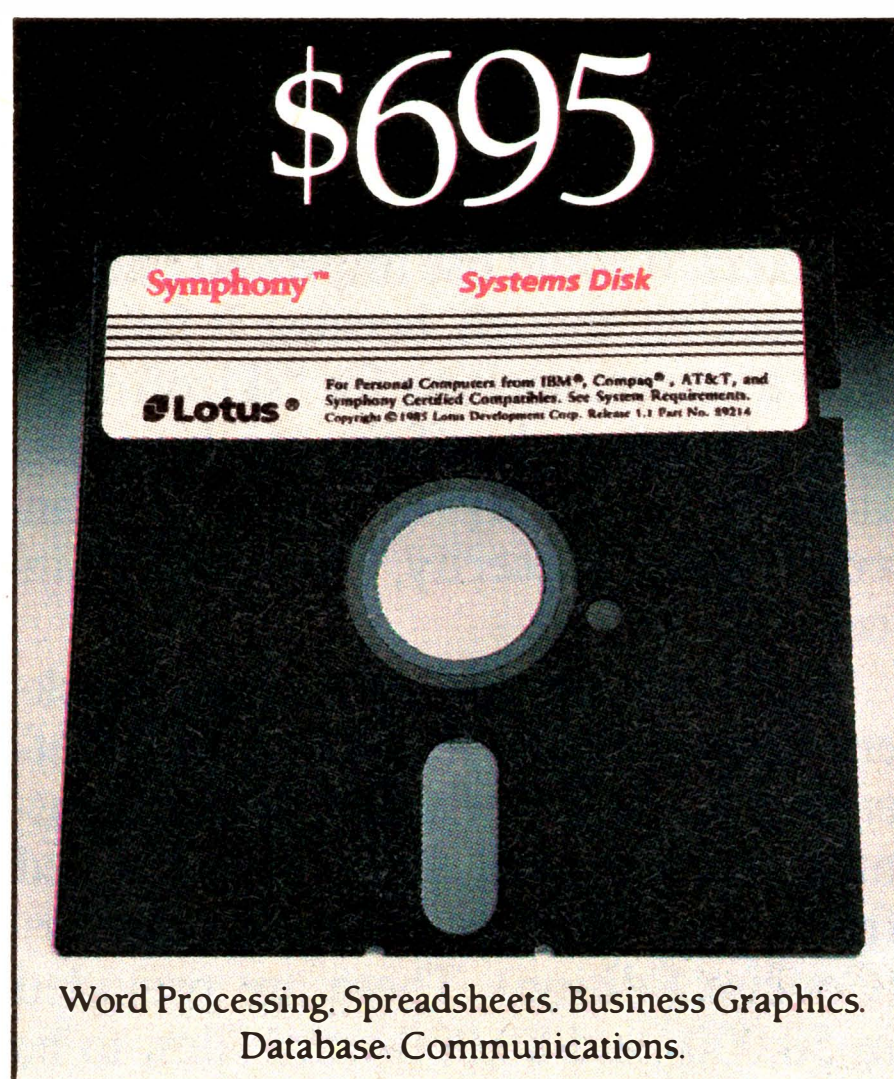
You call up Turbo Lightning as a memory-resident program when configured with any of a dozen best-selling word processors. You bring its bar menu to the screen by pressing Shift-F8, and spelling suggestions pop up in a window if you press Alt-F9. When checking for a correct spelling, Turbo Lightning starts with an in-memory file of 6,000 words. If a word is not found there, the program will search through its disk-based dictionary for an alternative. When tested, it picked up 22 misspellings and provided alternatives with impressive speed. Turbo Lightning almost instantaneously displayed "March," "York," and "of" as correct spellings and typically took a three-second disk access to provide "collaborate" or "putting." Then again, it too had problems deciphering "Cincerlly," giving such alternatives as "Cinderella," "Concretely," and "Cinderous," but not "Sincerely."

Mac users have a wider selection of stand-alone programs from which to

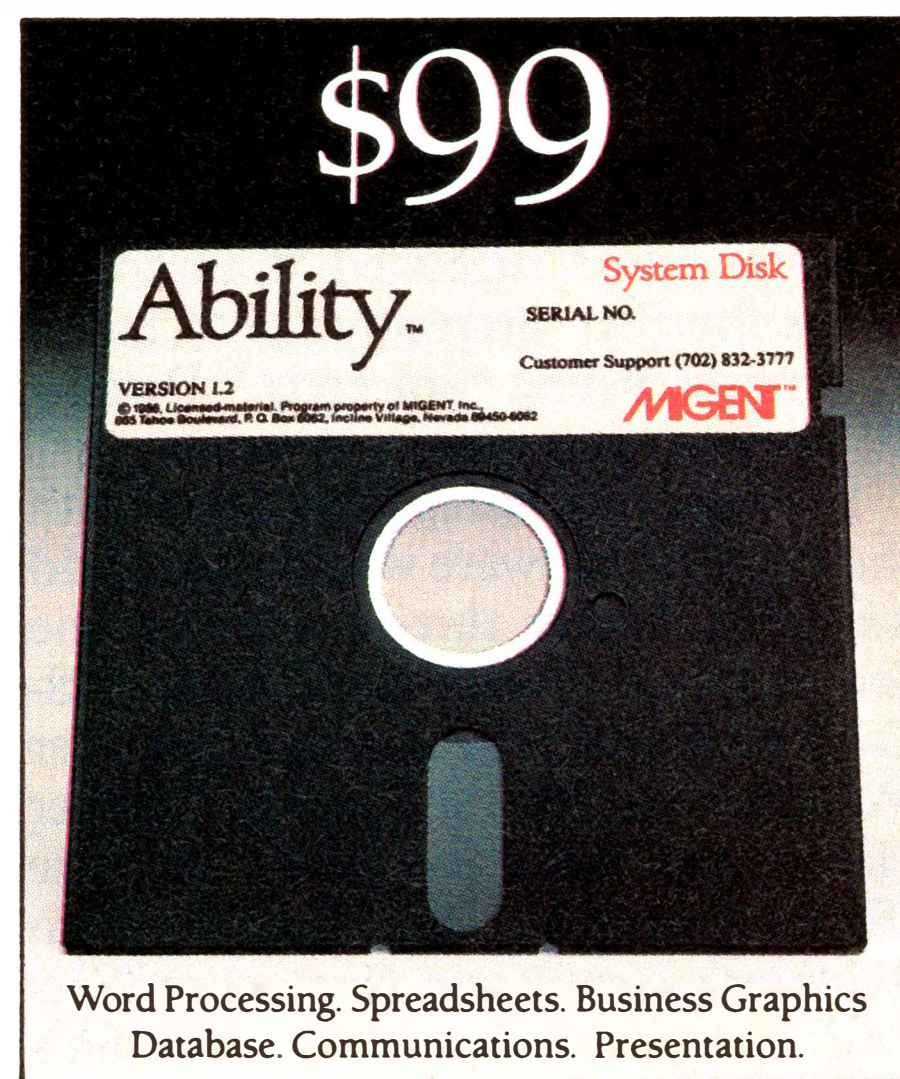
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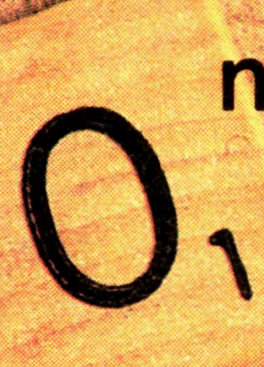
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One drawback to spelling checkers is that they don't check word syntax. So, valid words that, in context, are really misspelled get through.

choose. MacLightning is the only Mac spelling corrector whose dictionary is based on a mainstream, hardbound volume: *Merriam-Webster's Ninth New Collegiate Dictionary*. All the other programs use either in-house dictionaries or spell-checking engines bought from third parties.

MacLightning's dictionary loads automatically when you activate the program from the Apple menu. It also adds a separate menu to the Mac's menu bar to enable the selection of an optional thesaurus (also from Webster's).

MacLightning checks documents in either interactive mode or by specific word. Although it offers no in-context display, MacLightning analyzes a document for its total number of words, the number misspelled, the average length of a word, and the longest word in your document. Suspect words then appear in a separate window; you can alphabetize them before double-clicking on a word to call up the dictionary. Using the keyboard or MacLightning library of often-confusing icons (for example, a "walking fingers" icon for scrolling through the dictionary), you replace a word using your word processor's search-and-replace dialog box.

MacLightning offers keyboard shortcuts for mouse operation, invoking user dictionaries, and adding words to the main dictionary (which then appear in italics). Further, its phonetics engine lets it properly match words like "Cincerlly" with "Sincerely." And since MacLightning also uses pattern-matching in its algorithm, it presented some curious suggestions. For instance: "FM" for "fo"; "hue" for "hte"; "misplacement" for "mispelling"; "volcanos" for "Volkswagon"; and "one-sidedness" for "one-hundred-per-cent." In all, the program flagged 27 mistakes.

To its credit, MacLightning's dictionary loads automatically when you activate the program from the Apple menu. It also adds a separate menu to the Mac's menu bar to enable the selection

of an optional thesaurus (Webster's again).

Thunder is perhaps MacLightning's most serious competition, although the former is hampered by its use of the Clipboard to invoke corrections. The problem is especially acute when dealing with Microsoft programs, a problem that Thunder's maker claims is caused by Microsoft's inability to use Apple's guidelines for dealing with text on the Clipboard. Simply put, Thunder will not maintain a document's formatting (typesets and fonts) when it checks a Microsoft file.

Thunder's 50,000-word dictionary from Software Channels offers a user dictionary, and a learned words dictionary (which basically serves as a word expander, much like the glossary feature of Microsoft Word). To its credit, the program can work with more than word processors; it will, for instance, check spelling during a telecommunications session, in the Finder, in Page Maker, and every other program with which it was tested.

Although you can't delete words from Thunder's main dictionary, you can add up to 2,000 words to it, and you can augment root words with user-selected suffixes. When checking a document, you can use either the interactive feature or check an entire document. And you can activate each Thunder function from the keyboard.

In our test document, Thunder performed well. It flagged 29 errors and suggested 11 correct alternatives.

MacGas, another desk accessory, was perhaps the least satisfying of the Mac programs tested. Its dictionary (either a condensed 25,000-word or expanded 80,000-word file) can be located anywhere on a disk or in a folder. The program has a tendency to default to sound-alike words. It flagged 25 misspellings, but its pattern-matching algorithm merely cited words with similar letters. It's up to you to scroll through the display window in search of the correct word.

In its favor, MacGas (Glossary and Speller) was one of only two of the Mac programs we tested to catch "self-taut"

and offer "self-taught" as an alternative. Also on the plus side is the ability to set preferences to check and maintain capitalization.

It's interesting to note that the program's glossary feature was originally released by EnterSet as Quickword, a desk accessory-based word expander. Finally, MacGas proved surprisingly adept at dealing with proper names and places, such as Lincoln. Most of the other programs tested had limited capabilities here, other than enabling you to add geographical names to either the main or custom dictionaries.

MacSpell+, another desk accessory-based Mac spell checker whose operation is limited to checking MacWrite (2.2 and 4.5) and Word (1.0 and 1.05) documents, lets you add words to the main 75,000-word dictionary (350k) and generate custom dictionaries. It also provides a running word count and displays suspect words in context.

Its performance on our test document, however, was less than satisfactory. It flagged 27 errors, but only offered seven correct suggestions. The incorrect suggestions bordered on the comical. For instance, for "business" (which was properly spelled) the program suggested "bucksins," "buskins," and "buxomness." For "prefect" we got "perversity;" for "niether" we got "nitro." Finally, the program checks an entire document only; it will not proofread a selection or look up individual words. In its favor, MacSpell+'s speed of operation increases after it reads the first 100 words of a document.

Spellswell is one of two stand-alone Mac spelling correctors (MacProof is the other) tested. The program has much to recommend it in terms of hooks and amenities; however, its performance in catching the mistakes in our test letter was less than glowing.

First the hooks: a homonym checker; keyboard shortcuts; the maintenance of fonts, capitalization, and typesets; an ability to find double words; custom user dictionaries; and two dictionaries (either 60,000 or 93,000 words).

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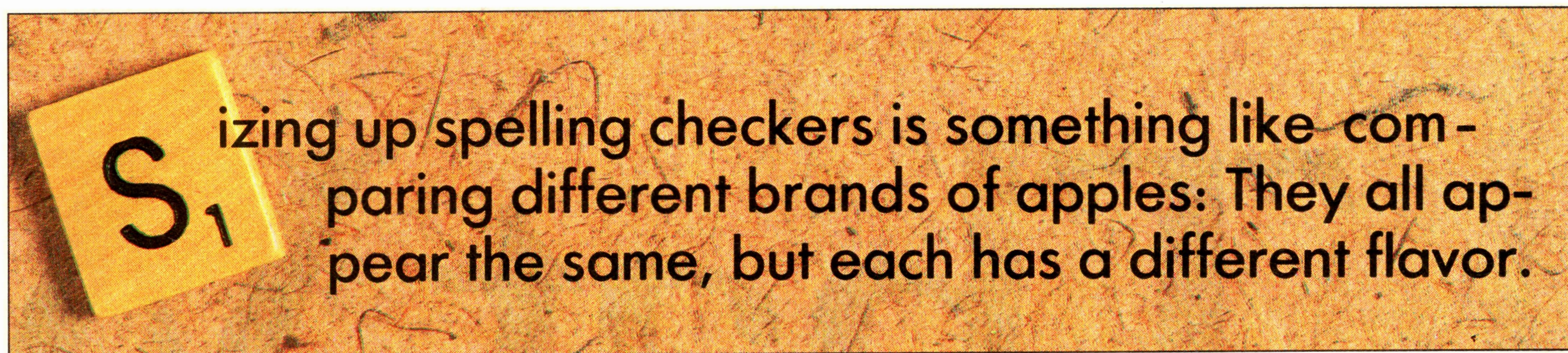
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As a stand-alone application, it's necessary to start up Spellswell and then select the document (from a word processor, Jazz, ThinkTank, More, or any text file) you want to check. In testing our document, Spellswell flagged 28 mistakes, but only suggested three usable corrections in comparison to 25 incorrect suggestions. For instance, it listed "misstate" for "mistakes"; "one-horse" for "one-hundred-per-cent"; "skiwear" for "skizofrenik"; and "overact" for "overacheiver." In its favor, Spellswell correctly suggested "self-taught" to replace "self-taut." It also flagged the double word "over" and offered a capital "I" to replace the incorrect lower-case occurrence of the letter.

Spellswell's homonym (sound-alike word) checker is another plus. It suggested 19 alternatives to the words in the letter, many superfluous, but still gives the user the option to replace or skip the suggestions.

MacProof, the second stand-alone Mac application, is the most unusual of the programs considered. It's intended for serious writers and those still learning the craft—it's an analyzer, not a corrector. Consider the following message issued while MacProof checked a document for spelling errors: "The words indicated were not found in the dictionary. They are probably misspelled. If you are not sure, consult a dictionary." In other words, go look it up (and learn) for yourself.

MacProof, which works only with word processing programs, offers broad capabilities for completely analyzing a document, including checking for mechanics (punctuation, capitalization, and double words), usage (racist and sexist words; confused, vague, and overworked terms), style ("be" verbs, expletives, and the passive voice), and structure. This is a serious, all-inclusive document analyzer.

Rather than offer spelling alternatives, the program provides a list of suspect words. When checking for sexist or

racist terms, MacProof provides an explanation of what it considers sexist or racist writing and then either displays a list of the offending words or shows them as they appear in your document. Using the program's ample keyboard shortcuts, it's possible to print the document (at any stage of the analysis) for later correction.

In our spelling test, MacProof flagged 22 words as misspelled. Again, no alternatives were offered. It also caught the incorrect lowercase "i" in the document and flagged the double word "over."

Finally, MacProof's main dictionary (93,000 words) can look up single words independent of a document. You can also add words to the dictionary, but the program has no facility to conjugate regular words. You have to make a separate additions with suffixes if you want the dictionary to recognize all the various permutations.

After trying out myriad spelling checkers, the impression lingers of how sophisticated yet incompetent they can be. With only one or two exceptions, they recognized as correctly spelled such esoterica as "stadium," "aria," and "schmaltz," yet all but DisplayWrite 3, MacLightning, and Thunder incorrectly labeled "remap" a misspelling. Many of these computerized spellers recognized proper nouns and avoided flagging them, yet none was designed to spot improperly capitalized words in the middle of a sentence. And then there were the correctly spelled yet incorrectly used words that escaped all the programs tested: none spotted "Deer," "sea," or "right" and only one highlighted "talc," whereas any business reader would instantly know that you had misspelled "Dear," "see," "write," and "talk" and certainly think the less of you or your secretary.

Cramming more words into spelling dictionaries is not the answer for perfecting checker software. Rather, look for the next breakthroughs to come from syntactical spelling checkers that can recognize words misused in context. Fast access to large blocks of memory, made possible by the new Intel 80386 and Motorola 68030 microprocessors,

will make "intelligent" spelling checkers commonplace, along with accurate translation from one written language to another.

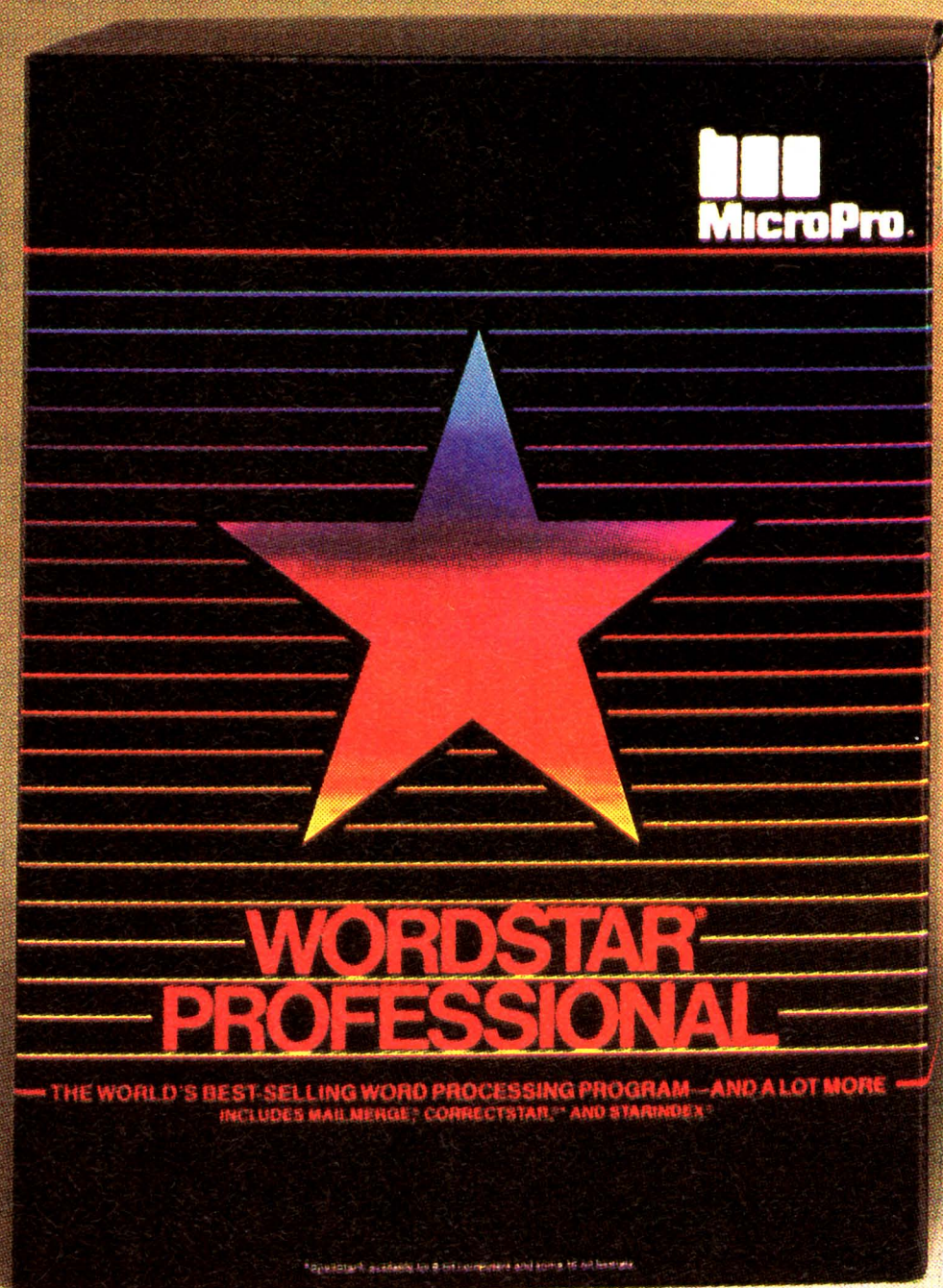
Major improvements with spelling checker technology will almost surely add to the overhead of internal memory and disk storage, unless this feature becomes embodied on a chip of its own to be included in new computers, like graphics and math processing are now.

One step in this direction is Xerox's PC Type Write, a peripheral box a little bigger than a pack of cigarettes, easily connected between keyboard and IBM PC to allow real-time checking of input against a self-contained 100,000-word dictionary (modifiable with 1,200 user words). The dictionary, developed at the Xerox Palo Alto Research Center (PARC) in conjunction with Microlytics, Inc., of Rochester, N.Y., is the only one to include such proper nouns as Alcoa, Amadeus, Berlitz, Dylan, Ike Ektachrome, Forbes, La Guardia, Pepsi, Rutgers, Sanyo, and UCLA.

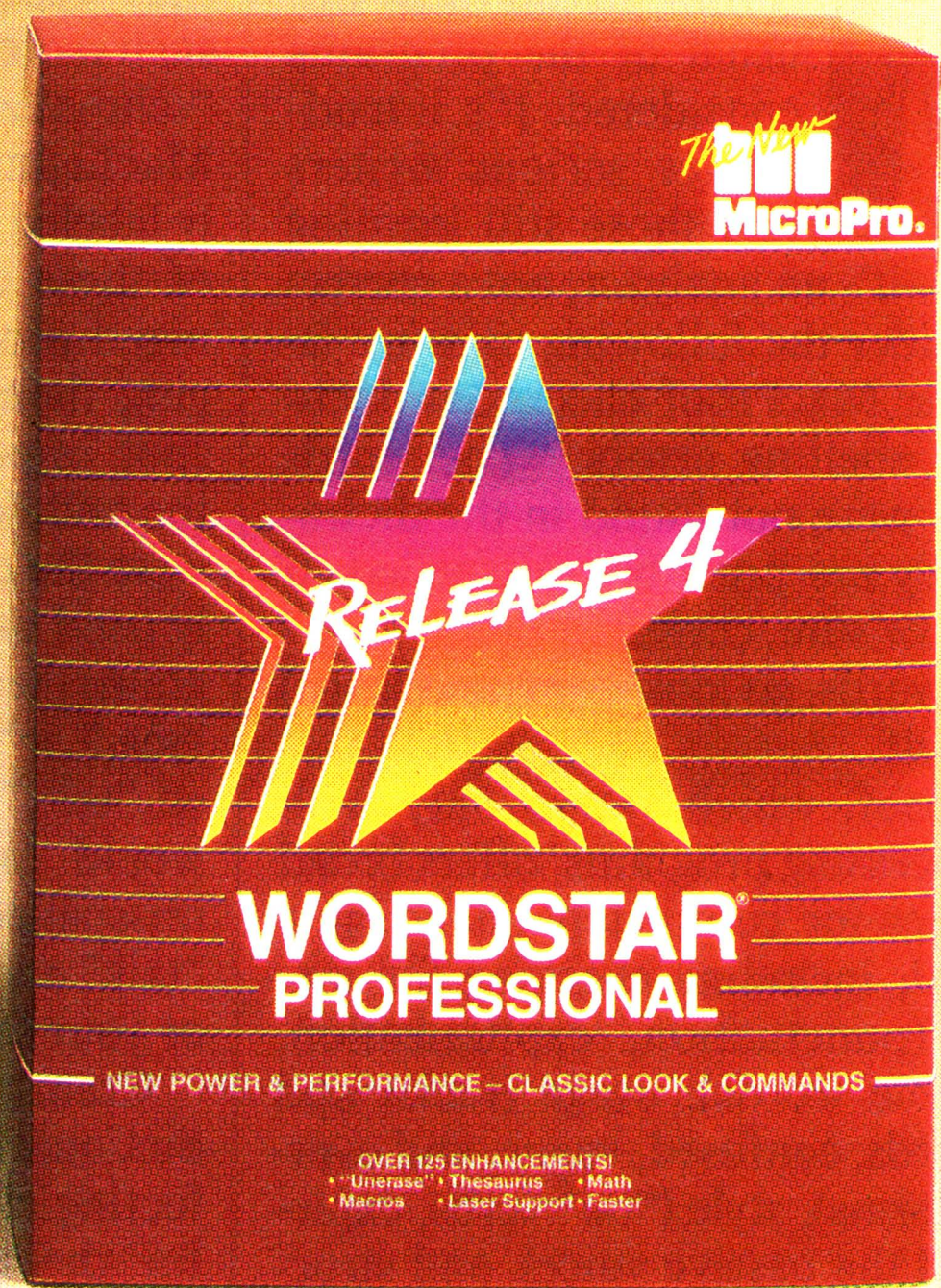
This same dictionary will soon be available on disk as part of Microlytics' Spell Finder program, to be included in several major word processing packages. A beta version of Spell Finder was used as a memory-resident add-on to WordStar release 4 and tested a screen at a time on the sample letter. It highlighted 26 "misspelled" words, tripping up on "Ms." and "remap." Its correction algorithm worked well, offering a single correct suggestion for "autobiografy," "overacheiver," "Volkswagon," "fo," and "hte," yet failing to suggest any alternatives at all for "skizofrenik" and "Cincerlly." Most impressive was the fact that an entire 100,000-word dictionary was squeezed into 114k of disk space—a twofold improvement on previous compression schemes.

The compression system used for Spell Finder and PC Type Write opens the way for all sorts of dictionary-based functions on a chip. And expect such chips to include the next candidate for becoming a standard feature in word processing—the electronic thesaurus, which will provide synonyms at the touch of a key. ■

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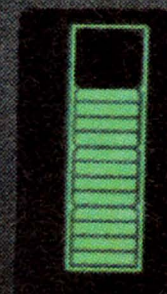


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UNITED THEY STAND: Jack Healy and Bernadette Connors (left and right foreground), and the Bay Area United Way's telemarketing team used a LAN to revamp its fund-raising efforts.

WHO MANAGES THE NETWORK?

Choosing the right LAN can enhance your department's productivity; finding the right LAN manager is just as critical.

by Henry Fersko-Weiss

You've read about LANs, heard about LANs, and now you've decided that your department is ready for, and needs, a LAN. For the next several weeks, possibly months, there will be an avalanche of technical questions to be answered. What local area network software is right for our applications? What kind of file server should we get? How should the system be configured? What cabling should we use?

You get the idea. But before you become completely absorbed in these issues, consider the fundamental

Contributing Editor Henry Fersko-Weiss wrote the "On-Line Contacts" story in the January 1987 issue.

puzzler: Who manages the network?

It's a vexing question for a number of important reasons. Getting a LAN is a strategic and tricky decision. The networked system affects the day-to-day performance of a department and has an impact on that department's overall performance and productivity. A LAN will also, presumably, become an office fixture, there for the long haul as an integral partner in the short- and long-term growth of your department. Finally, a LAN can be expensive.

Unfortunately, the question of who should manage the LAN begs a tidy answer. Much will depend on where the impetus for the LAN comes from and whether the corporate management information service (MIS) or data processing (DP) department is an active participant in the installation of the network. Also consider whether there is someone in your department who has a solid technical background, and how the new LAN will affect the workload of every individual in your department. Moreover, there are two phases of management that overlap in a LAN installation, and the designated manager may be different for each of the two phases.

The first phase involves planning the system, followed by its physical installation. The second phase focuses on the day-to-day administration of the LAN once it's up and running.

Planning is the most critical element in the first stage, when design and technical decisions are made. What applications will the LAN be used for? How many people will use it? What is the right LAN hardware and software for your needs? How will the system be configured? Where do you actually put the system? And who has access to which files? Resolving these issues is often delegated to the wrong person, and the result can be disastrous.

If the impetus for the LAN trickles down from MIS or DP as part of a larger corporate strategy, then input from any single department may often be delegated to a junior member who takes an inactive role and then simply reports back to the department manager. And even if the inspiration for the LAN comes directly from the department, this stage is still frequently relegated to a junior member, although it may be one who possesses some technical expertise and who is identified as the resident personal computer guru.

"Too often I see a department put an

administrative person in charge of a LAN project," says Mark Freund, vice-president of the Interconnect Network Consulting Group, in Pasadena, California. "It may even be the last person hired out of college, because he or she has had some experience with personal computers. The more I come across this [unwisely delegating the job], the more I see the need for someone who has a firm grasp of the department's needs

Senior group members have the experience and foresight that are necessary to grasp why a LAN is being installed.

and a broader view of its direction."

The people with the best perspective on the department's needs and direction are its senior members—department managers and their immediate subordinates. They have the experience and foresight necessary to grasp why a LAN is being installed while, at the same time, being in touch with the overall direction of the entire corporation. Because the LAN's planning phase establishes the tone for what follows, it is especially important that a senior department member assert control. Planning may only account for 10 percent of the time it takes to install a LAN and to get it running properly, but it is the most important part of the entire process. "The most successful installations are the ones where a high-level management person is integrally involved in the initial scoping out of the project," says Freund.

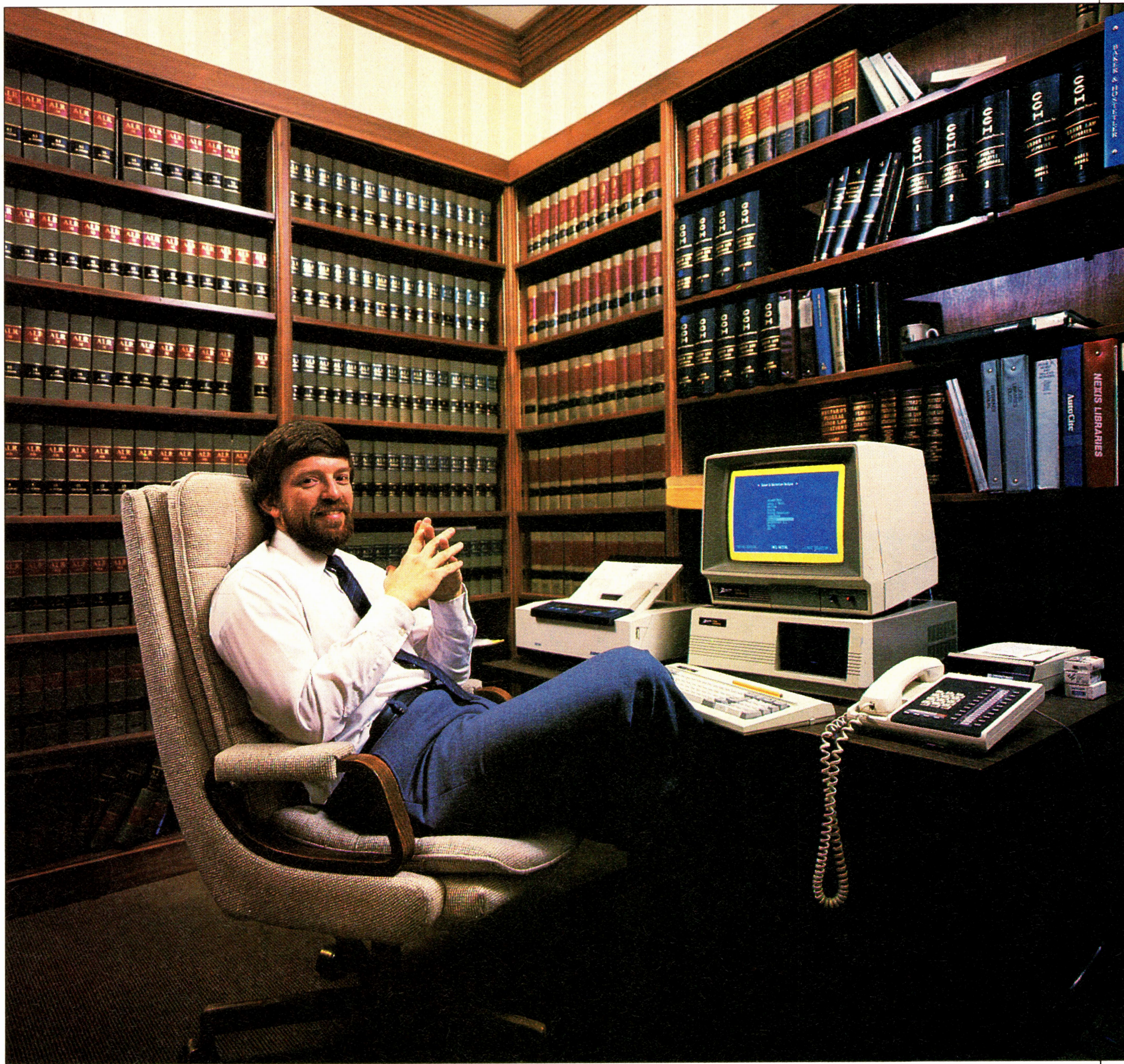
"High-level manager" is certainly the right appellation for Jack Healy, the associate executive director of the United Way of the Bay Area in San Francisco. He managed the planning and installation phase of a LAN project last year be-

cause he was also the manager of a special project that demanded the broad scope and breadth of applications that a network offers.

The Bay Area chapter of United Way realized that its approach to fundraising was out of synch with the dynamic economic environment in northern California. United Way officials decided to establish the New Business Development Group, and Healy was the man for the job. Some statistics on the ever-changing business population point up the urgency of the United Way's project. Two years ago there were about 50 large companies with headquarters in the Bay Area. By early 1986, there were only 25 comparable companies in the area; and more than 15,000 people, once a part of the larger corporate work force, had found employment in small- and medium-size companies—companies that the United Way wasn't reaching with its traditional corporate approach. "We had to respond to the drastic change or lose precious funding," explains Healy. "The answer was a telemarketing and direct marketing program aimed at the people who had moved into the smaller companies—and we needed it fast."

One of Healy's first decisions was to get a LAN. He knew that an intense telemarketing effort required the simultaneous sharing of a common data base. As a foundation for that data base, Healy purchased a Dun & Bradstreet data base with information on 21,000 companies. Because of the extreme time constraints, Healy couldn't wait for his DP department to supervise the technical end of installing a network. Healy turned to Interconnect, Freund's consulting group. "But I managed the LAN project, because the goals of the LAN and the goals of the group were closely intertwined," says Healy. "All the activities of the group, such as lead generation, direct mail follow-up, scheduling of volunteer help, sales tracking, account management, and so on, are all totally dependent on the operation of the LAN. There were decisions to be made on all these applications, so the project [installing the LAN] needed somebody who understood them and how they would support the sales operation. That person was me."

Mind you, Healy banked on Interconnect's advice, because the consulting firm knew how to transform Healy's application needs into the right software and hardware. Interconnect, however, could not have installed the right system for the United Way without Healy's input. "Planning is a fluid proc-



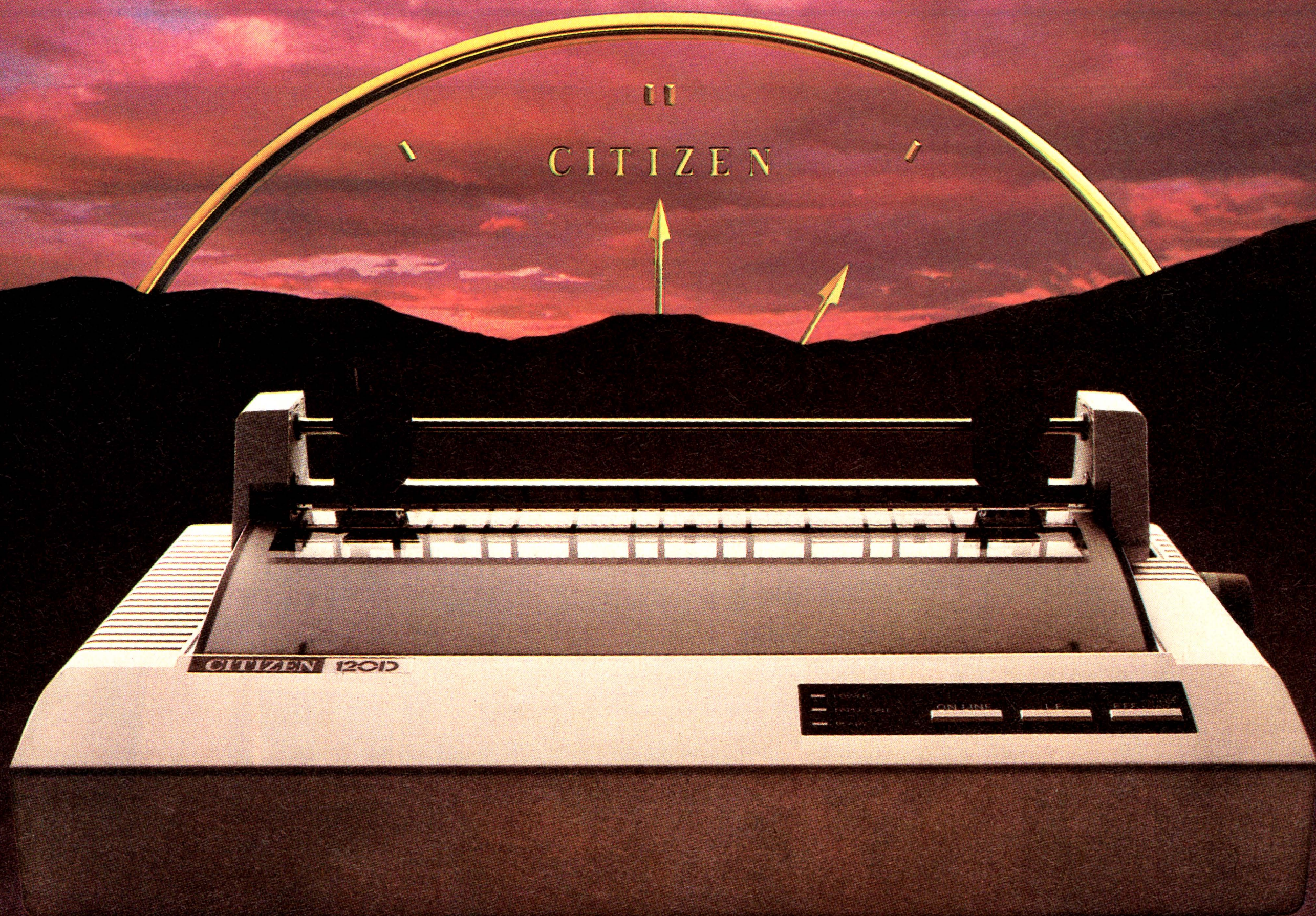
LEGAL LAN: Attorney Bob Ellis, Columbus, Ohio, can now strike a comfortable pose after he grabbed the initiative and explained specific network options to the firm's partners.

ess," says Freund. "As you go along there are bound to be changes, and you need someone who understands the project intimately to keep it on track." The United Way's network finally went on-line using Novell's Netware in an IBM Token Ring configuration. It has been up and running smoothly since this past June, and is now the backbone of the United Way's revamped fundraising efforts.

There are exceptions to the general rule that the manager of the first phase of a LAN installation should be a senior member of a department or an executive. If the LAN serves a number of de-

partments, then it may be prudent to keep its management under the auspices of the DP or MIS departments—which will most likely be supervising the LAN's actual installation. Interdepartmental needs and the possible connection of the system to the corporate mainframe makes a person with a technical background the logical choice to serve as the overall project manager. You should also be aware, in this example especially, that it's important to have an advisory group comprised of senior department members to ensure that the applications needs of each department are not overlooked.

It also makes sense to cede LAN management to data processing people if your department requires original programming for the system's applications. A keen technical eye will ensure that the application software is properly mated to the network's software and hardware. For example, a large Midwestern bank, which was wary of its competitors figuring out how it was using networks, assumed the following tack for its installation. "The initial phase of the project included a fair amount of programming, which the department people were obviously not qualified to do," says Bob Parenti, a



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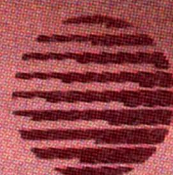
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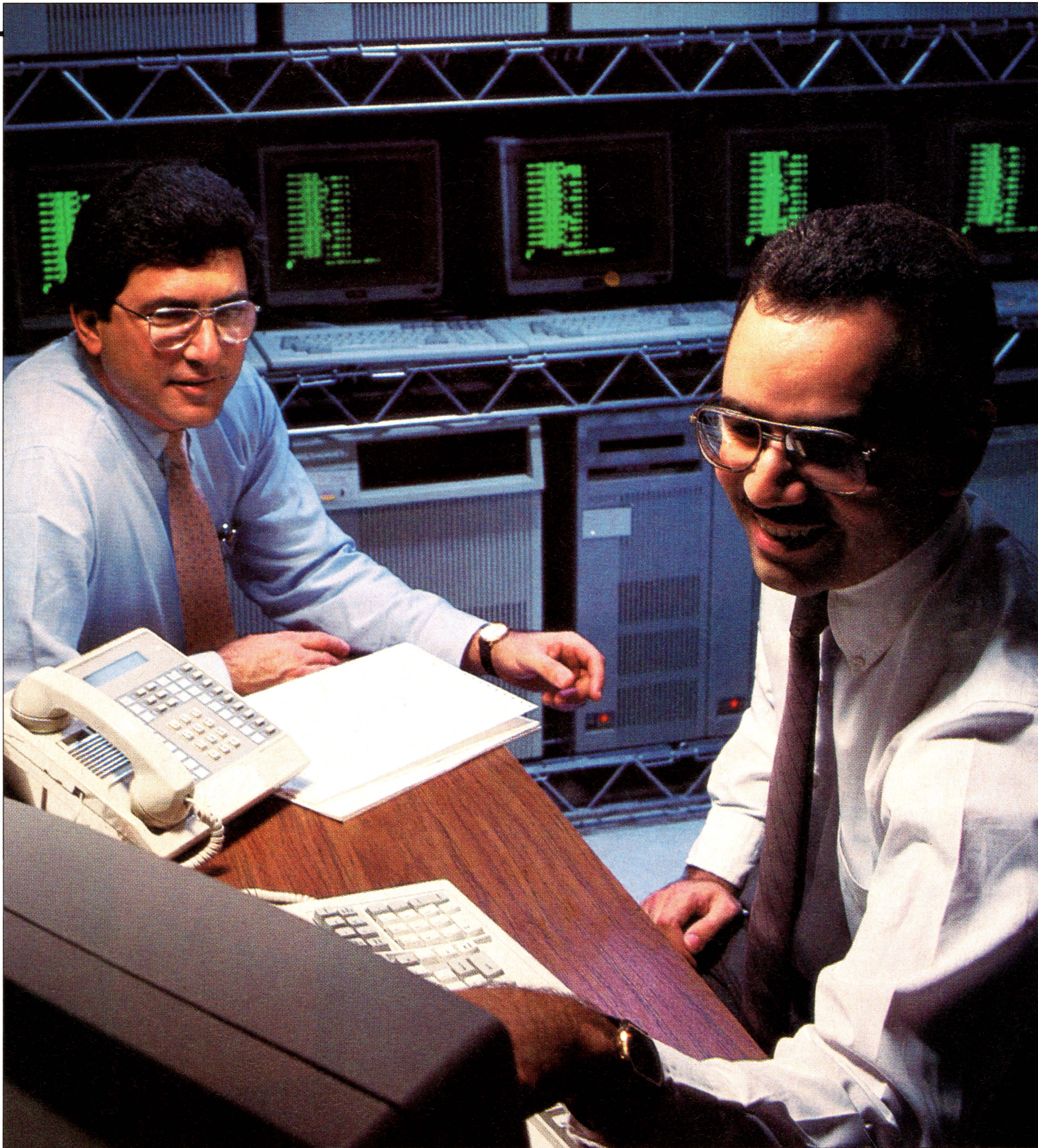
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DEDICATED MANAGEMENT: Standard & Poor's business systems director, Julio Menendez (left) recognized the need for an overall LAN manager and appointed José Rosario to the new position.

senior consultant in the bank's information systems department.

The person chosen to manage the LAN worked as a programmer in another department. He was hired directly by the user department, because that's where the budget dollars were. "We knew him," says Parenti. "We knew he wanted a change, and that he was familiar with dBase III—an important part of the system—and we had the confidence that he could do a good job."

There's another reason why a programmer was hired to work directly in the department where the 3Com LAN resides—it is 30 miles away from the in-

formation systems department where Parenti works. Even though Parenti has remote access to the LAN, he says that having the LAN manager on-site to answer users' questions as problems arise is a superior solution.

The LAN manager is still putting the finishing touches on the programs for the department's new system. When that phase is complete, he will bring each departmental user up to speed on the new applications. At present, the workload enables the LAN manager to remain as a full-time employee in the department. When the chinks are finally ironed out—as most LAN problems,

no matter how troublesome, inevitably are—the manager will move elsewhere in the information systems group. At that point, he will administer the LAN from a remote location, or perhaps train a department member to take his place as the front-line LAN administrator.

Another exception to the rule of using senior department members to manage the first phase of a LAN installation occurs in professional companies, such as law firms, real estate concerns, or group medical practices. Management at these companies, in general, is by committee—a group of senior partners, perhaps in conjunction with an office manager

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who oversees ongoing administrative or clerical work. Since these senior professionals are usually addressing the requirements of their important clients, it's not possible for them to partition blocks of time devoted exclusively to supervising a LAN.

The professionals in this type of situation have two choices: Appoint a senior administrator (such as the office manager or head bookkeeper) to manage the LAN, or give responsibility for overseeing the LAN to a junior professional member of the company. There are other important factors to consider, such as who will be the primary LAN users—administrative or professional personnel—and who in the office has the most experience with personal computers. The logical choice in this situation is an employee who will be spending the most time using the LAN, because it's likely that this person will have a firm grasp of the needs and problems that other LAN users will encounter. Also, it's often the case that the person who originally touted the LAN ends up managing the installation, not necessarily by default, but more as an expression of genuine interest and curiosity. It's important to recognize that personal initiative can play a positive role in the overall management of the LAN.

When the law firm of Gingher & Christensen in Columbus, Ohio, decided to replace the aging mag card typewriters used by its support staff, one of the firm's lawyers, Bob Ellis, began lobbying for a LAN. "I had spent a year in a New York law firm and watched them make poor systems decisions," Ellis says. "I didn't want to see it happen again, so I started writing memorandums to the partners explaining their options and recommending a LAN." Ellis had some programming background and understood the capabilities of LAN technology.

Finally, the firm gave the green light to Ellis and his LAN plan, offering him the job of managing the project. The total cost of the installed network was in excess of six figures. "Once I got involved, it was like quicksand," says Ellis. "But it was my system and I loved it." By the time he was done installing the Fox Research 10 Net LAN, there were 22 nodes on the system.

As Ellis' involvement in the planning and installation of the network increased, he discovered, perhaps to his

chagrin, that this phase of the LAN installation was more time consuming than he expected it to be. It's a factor that every LAN manager has to address and somehow overcome, says Interconnect's Freund. "You have to shunt your normal work off to someone else or work overtime," he says.

Ellis did both. By his own estimate, he devoted about 600 non-billable hours getting the LAN established—

It's often the case that the one who originally touted the network ends up as the overall manager of the installation.

including logging time after-hours and on weekends. Overtime aside, Ellis would never have been able to wear both hats if the firm hadn't tempered his normal workload by about 20 percent. To be sure, the time he devoted to the first phase of the LAN project detracted from his practice of international and computer law. To his credit, Ellis didn't resent the additional burden—actually, he's quite proud that his efforts have been a boon to the firm as well as a learning experience. Today, the system only requires 30 minutes of his administrative time each week.

Ellis' responsibilities now include the second LAN management phase. It's inevitable that the management responsibilities will evolve once the installation is complete. The technical issues have long since been resolved, unless, of course, new applications must be added to the system. Adding a new application to the LAN should be considered as an independent project that has its own phase-one management needs. Phase two management is comprised of adding new users to the system, answering users' questions, getting the system re-

started if it fails, acting as the liaison to the manufacturers or vendors of the software and hardware, backing up the shared data bases, and making sure the file server isn't overburdened. In general, LAN experts and managers say these administrative functions require no more than 10 to 15 percent of a normal work week. It's a job that can easily be handled by a user of the system. Indeed, it should be.

"Once a LAN is in place, most of the management function is a matter of answering users' questions and troubleshooting system problems," says Dan Marshall, a technical instructor with Novell, maker of the Netware LAN. "It should be somebody who may have encountered the same problems, not only with the LAN but with the application software as well. Somebody who knows what a user is trying to do. Since this person will also have to train new users, it's a more natural and productive process if these people work together on a daily basis."

System security is also a significant issue, especially when your department deals with sensitive data, such as personnel records, salary information, or corporate information. Making sure that LAN management resides within the department adds an extra layer of security to the system, even though the LAN administrator has access to every record and file on the system.

The person who manages the second phase of a LAN project is usually called the system administrator. The term accurately reflects the reduced management requirements at this stage. This job doesn't require a senior department member, nor does it require the technical expertise of a data processing person. In fact, an administrator's duties are often so simple that they soon become mechanical. For example, Freund mentions the eye-opening system used by a large Dutch company: "Although I don't believe this is the right approach, the company has the night cleaning people back up its LAN—that's how simple the network is."

The primary requirements for the system administrator are a technical aptitude and a willingness to help other users. It's useful if the person chosen is experienced with personal computers, but it's not essential. All the manufacturers of network software offer a variety of training programs for systems administrators. Another prudent training approach is to get the administrators immersed in the project as phase one is transformed into the actual installation stage, after all the planning is complet-

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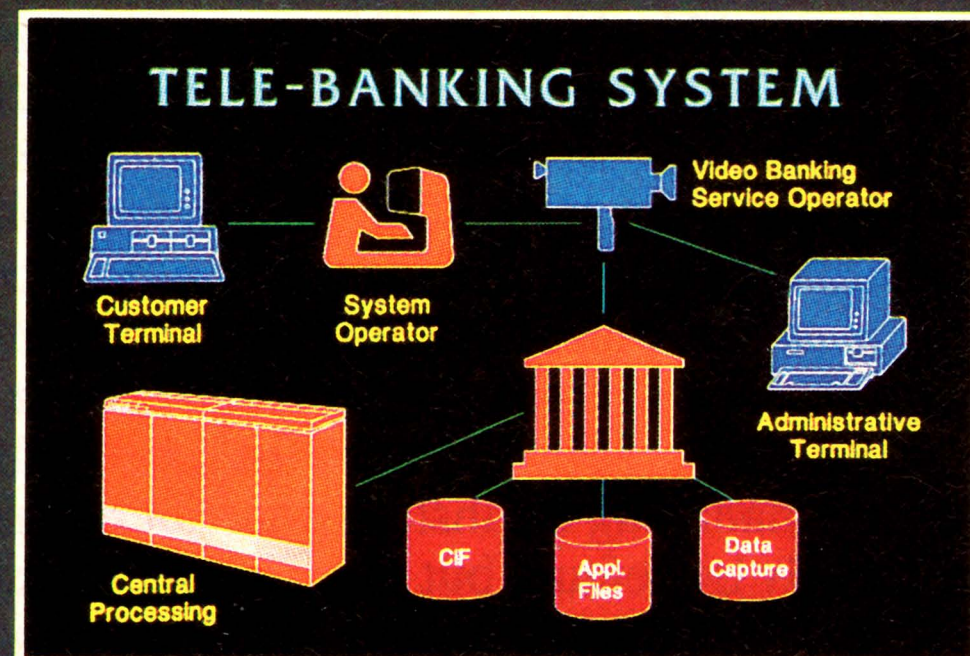
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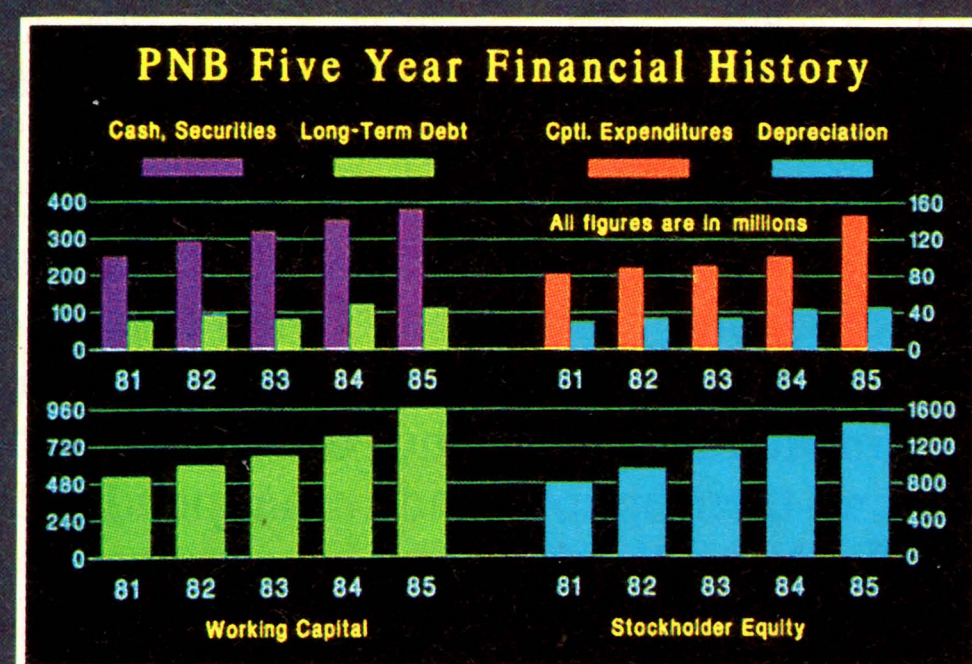
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ed. "By involving the administrators in the installation, you give them a chance to learn the system inside out," says Freund. "That helps when a problem has to be diagnosed. It also lets the administrator become familiar with the people who represent the vendors." As phase one nears completion, the LAN manager has an opportunity to begin delegating more responsibility to the system administrator.

A willingness to assist network users is an important trait for an administrator to possess, especially since he or she will often be dealing with users' problems. "The administrators have to get personal satisfaction from improving the way people in the department do their jobs, or it can be too much of a strain," says Bob Rolla, OEM marketing manager at 3Com, which has installed about 30,000 of its Ether series networks.

Department managers have to be especially aware of the signs of administrator burnout. The first administrator Healy used for the United Way LAN simply couldn't cope with the strain of performing two jobs. The present administrator, Bernadette Connors, has begun to show some signs of being overburdened by her dual responsibilities. "She's got a job and a half," Healy says. Connors puts in two-and-a-half hours a day as the network administrator, while the balance of her 60-hour week is spent as the office manager, analyzing research data on company prospects and producing reports. "I haven't decided what to do about it yet," Healy says. "I might take the telemarketing management away from her or simply hire an administrative assistant for her."

A partial solution that is under consideration is for Healy to send a member of the United Way's DP department to the administrator training course offered by Novell. Then, at least, Healy's department would have an expert in the on-deck circle in the event that Connors is too involved in a telemarketing project. "Having somebody in data processing who understands the LAN will also help Bernadette if she runs into problems that are too technical for her," Healy says. "This will give the administration of the LAN good balance."

A backup person for the system administrator makes good business sense for a number of other reasons. What happens if there are problems with the

LAN while the administrator is out ill or on vacation? "It's always a good idea to cross-train a second person," says Donald DiBrita, the national director of professional support services for Nestar Systems, maker of the Plan 3000 LAN. "My basic philosophy is to back up every aspect of business, not only LAN management. That way, you are prepared for any eventuality. And, if the LAN should become too big for one ad-

Managers have to be aware of administrator burnout—people who can't cope with the strain of doing two jobs.

ministrator, you can off-load some of the responsibility to the backup administrator." This backup person can be another LAN user or a data processing person. A DP representative is preferable because technical problems will not be beyond his or her expertise.

Under some circumstances, the administration of a LAN will rest with the MIS or data processing department. Even then, there should be a departmental user liaison. When LANs become very large, span several departments, or are important to the daily operation of a company, then the management typically rests with the MIS or data processing department. "The basic question to ask is: 'If the LAN goes down, does it have an impact on the whole business?'" asks Vern Yates, the vice-president and general manager of the personal computer division of NCR Corp., maker of the PC2PC LAN.

"If a LAN is used for order entry or billing or some other daily production process, then it should be managed in a highly structured environment," continues Yates. "What this environment is depends on the style of the organiza-

tion. If it's a centralized company, then the LAN will almost certainly be managed out of MIS or a like department. In a decentralized company, the management will come from some other functional group, such as office automation, or office management, for example."

An example of a decentralized company is Standard & Poor's in New York. The company has two large Nestar Plan 5000 LANs in its debt rating department, and each LAN has several work groups on it. The larger of the two LANs, for instance, includes the international group, the financial institutions group, and the industrials/utilities group. The financial institutions group alone has 62 users, and there are a total of about 150 users on that LAN. The overall network manager of the LAN, a newly created position, is José Rosario. This past October, before he was appointed as the network manager by Julio Menendez, business systems director, two other systems administrators shared the responsibilities of applications support and network support. "The LAN was taking away too much time from the applications work," says Rosario.

Rosario is in the systems group dedicated to debt rating. His function with the LAN is to handle configuration issues, analyze major problems with the LAN and restore it if it goes down, allocate space on the file servers, and so on. There are local administrators at the group level—senior analysts in each planning group. They will address and implement the needs of the users in their area, install special applications, modify applications, and answer users' questions. It's nearly a full-time job.

Standard & Poor's has a third group (the minicomputer group) to oversee the backing up of the LAN. This group simultaneously performs minicomputer and LAN backups.

LAN technology is maturing rapidly. Systems are becoming more reliable and easier to connect. As these improvements accelerate, LANs will require improved management in the first phase of installation because they will be both more powerful and more flexible strategic tools. The LAN will also require less administration in the second phase because there will be fewer glitches.

The better LANs become at performing tasks, the more important it will be for managers to designate a senior department member to become involved at the genesis of the project, and the easier it will be to delegate administration to a more junior user once the system is up and running. ■

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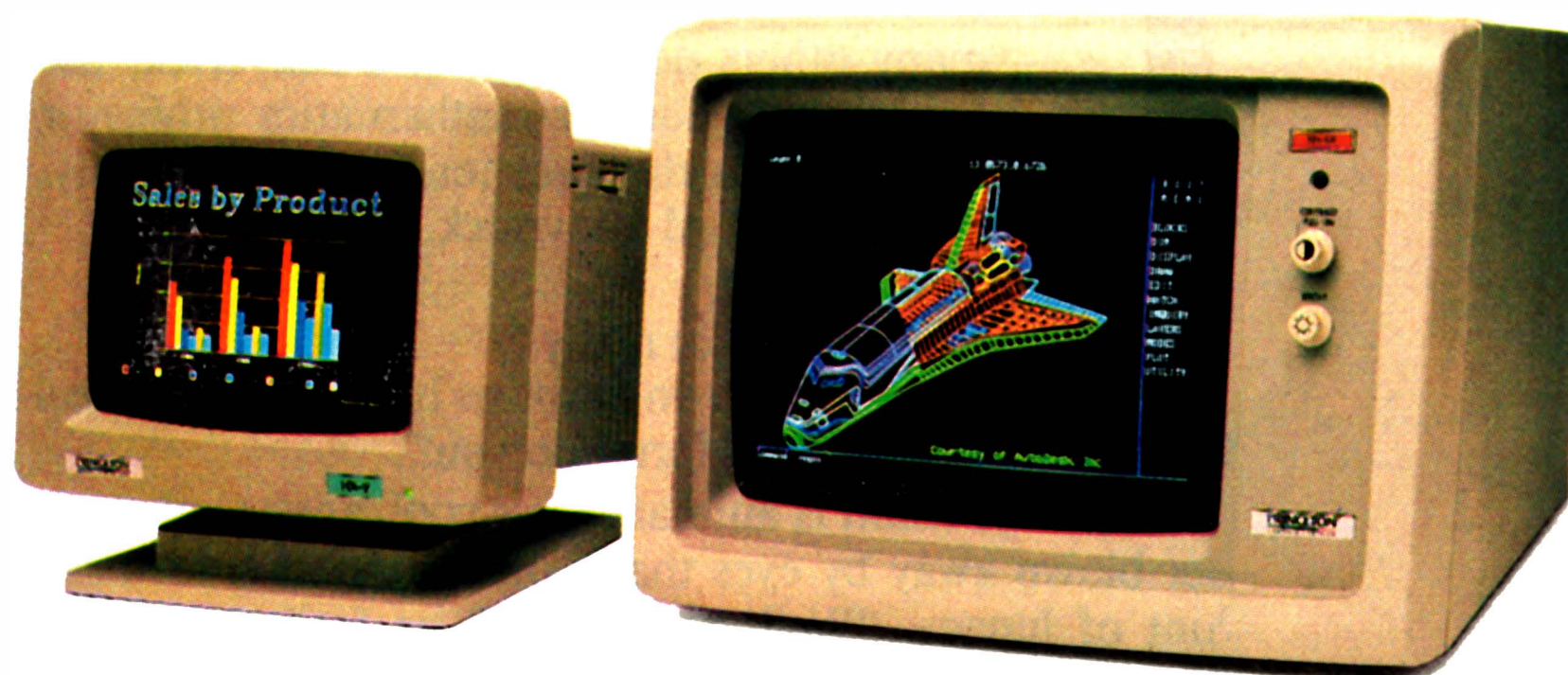
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PHILIPPE KAHN, PRESIDENT OF BORLAND

The Maverick

Philippe Kahn, the 34-year-old president of Borland International in Scotts Valley, Calif., has kept his cool so far—contrary to his reputation as the flamboyant, outspoken champion of low-priced software. Asked if he feels, as many others do, that he is a maverick, the French-born former mathematics professor breaks down the question, coolly, logically.

"Define for me the word 'maverick,'" he says.

"Maverick" is defined.

"I dunno," he says. "Not really."

Then he is asked: "But, on the other hand, you don't feel any compunction to conform, do you?"

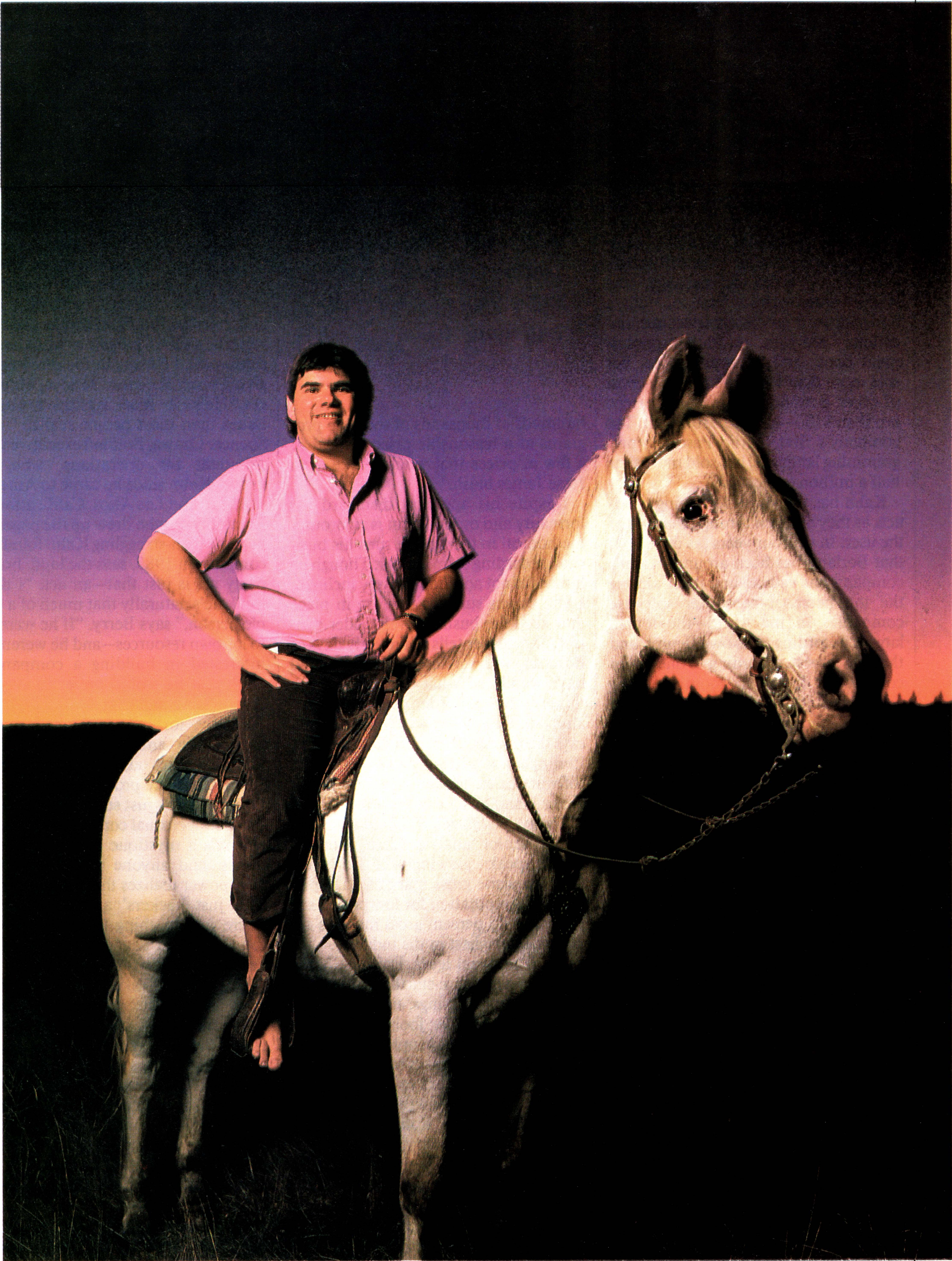
Suddenly, Kahn is animated, his cool, analytical manner blown away by eyes that dance with his trademark hint of lunacy. "Well, you know!" he fairly explodes, "there was a time when everyone thought the universe was revolving around the earth. I feel it would have been an honor to have been a maverick, to think that the earth was actually turning around the sun. People get in trouble for things like that. So sometimes, yeah: I would say that when I'm in the middle of conservative people, I feel liberal. Conversely, when I'm in the middle of liberal people, I personally feel conservative.

"Is that being a maverick?" Kahn asks, summing up. "Well, that's merely the way I am."

Indeed. It is Kahn's peculiar mix of rigorous logic (which shows up more in his products than in his own be-

David Garfinkel is a freelance business/technology journalist who makes his home in San Francisco.

**by
David
Garfinkel**



havior) and outrageous fanfare (which friends say is more public show than the private person) that has earned him a highly visible spot among the personal computer pioneers of the last 10 years.

As an industry figure, he is credited with having exerted a significant influence. "He created and defined low-cost utility software," says George Morrow, an early computer entrepreneur. Dan Bricklin, who designed the VisiCalc program, which more than anything else, fueled the first personal computer sales starting in 1978, says that Kahn single-handedly "legitimized mail order software."

Borland's SideKick package, the RAM-resident utility that includes a notepad/word processor, telecommunications program, calendar/appointment book, and other functions, has sold more than 1 million copies. A host of other Borland offerings—all priced less than \$100—have also sold well. The company's first, Turbo Pascal, a programming language, has sold more than half a million copies.

Kahn has the knack for seeing products as they are seen through the eyes of the user. In the four years (as of May 2) that Borland has been around, Kahn's company has established itself among the top personal computer software companies in the world—the fourth largest, according to its own figures, and the fifth largest, according to one major competitor. In the six months ending September 30, reported in December (Borland stock is traded on the London Unlisted securities exchange, which requires six-month reports), Borland chalked up profits of \$1.8 million on sales of \$14.4 million.

But in his short tenure in this young industry, Kahn has already racked up an impressive list of bewildering contradictions. Untangling these will further help in getting to know this leader, who is expected to continue to have an impact on what you use on your personal computer, and how you use it, in the immediate future.

Probably the biggest paradox about Philippe Kahn is his seemingly chaotic manner, contrasting so sharply with the company that he keeps running, in fact, like clockwork. The consummate rebel-without-a-tie, Kahn often gives the impression of not giving a hoot about anything that might include the word "businesslike." In one 1985 advertisement, Borland proclaimed, "We're not greedy. We believe that it is better to sell

Kahn has a genuine fascination, bordering on reverence, for personal computers. 'There is a mystique about those machines,' he says, 'And anyone who experiences their power realizes they're more than just hackers' and nerds' tools.'

hundreds of thousands of software programs at a reasonable price instead of a few at prices that would make even Jesse James blush."

Despite his apparent disregard for formality and order, Kahn is rigorously methodical in the way he runs his business, according to an insider. Though he himself is not administratively inclined, Kahn makes sure systems are in place that keep the business well under control. The insider tells of the early days of Borland, when a casual visitor would have wondered what was going on at this mostly mail order company—or if anybody *knew* what was going on. Yet, says the insider, "Beneath the casual air, Philippe was getting daily reports on software sales, broken down by magazine ad, and by type of response."

Today, *California Technology Stock Letter* senior analyst Lissa Morgenthaler speaks glowingly of Borland's "just exquisite gross margins." Despite Borland's reputation for low prices, she says, its 83.5 percent gross margins are among the highest in the industry.

On a personal level, Philippe Kahn presents even more startling contradictions. In public settings, especially, he is known not to suffer fools gladly. "I've seen him be rude to people for reasons I don't understand," says Morrow. "But I believe it is an effort to be instructive about a way of thinking as much as anything else." Further, Kahn comes across on podiums at industry meetings as irreverent and outrageous, and is well known for throwing wild parties where he will personally play in the band. (He usually plays saxophone, although he also plays guitar, piano, and drums.) At a convention, reminiscent of John Belushi's blockbuster movie "Animal

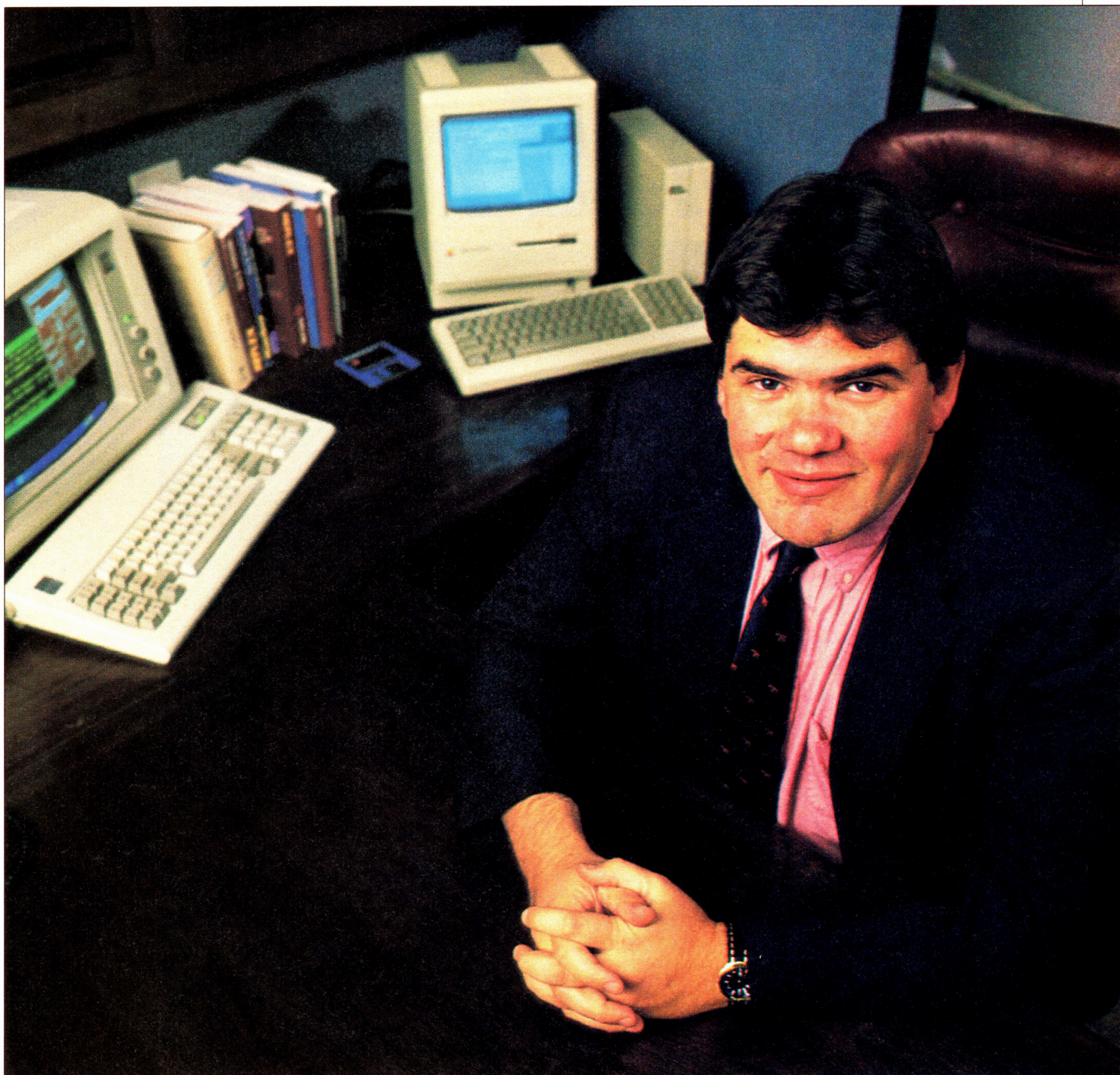
House," Kahn once threw a toga party. And in a *Time* magazine profile, he is pictured sitting outdoors and grinning, almost maniacally, holding his saxophone on a bare knee. The president of a major software company is wearing shorts and a loud Hawaiian shirt.

Yet those who know him well say that this party-animal public image has little or nothing in common with his private personality—save that he really is a musician. Several friends say he's basically "sweet," normally shy, and generous to a fault. Insiders say that while he's a hard bargainer with the outside world, he leans in the direction of giving away the store to loyal employees. "He's a lot more sensitive to human issues than most people realize," says Spencer Ozawa, Borland executive vice-president for operations, who has known Kahn since he came to America in 1982. And Los Altos, Calif., attorney Frank Berry, who drew up the papers to help the then-struggling Kahn found the company in 1983, says the loud, brazen party act is just that—an act. "I don't think he's naturally that much of a people person," says Berry. "If he were left to his own resources—and he weren't so interested in building a company—I think that he would prefer to stay on CompuServe and chat."

Finally, for someone who projects such a flip and irreverent attitude, Kahn is in fact quite reverential about the machines he provides software for. "I think there's just something fascinating about personal computers," he says. "There's a mystique about those machines, and anyone who experiences their power realizes they're much more than just hackers' and nerds' tools. There is something there that allows you to expand *your* personal capabilities and power."

By the same token, he doesn't take every aspect of computing too seriously. Concerning his own Turbo Pascal, which has sold, amazingly for a programming language, half a million copies, "I can't believe there's half a million serious programmers," he says. "I think most people do something with it, to try it. Just like a lot of people have bought guitars in their lives, and play a few chords. Most of them didn't become concert players, but they did have fun."

There are a number of explanations for these contradictions. One explanation is cultural. "He is a European," states Borland director David Heller,



who also represents British financiers in Silicon Valley. "French people, on the whole, are very much like Philippe. Generally, the French are a little more showy than Americans. Philippe will say things that shock people, just to get them to respond to him. But he's not malicious."

Another explanation has to do with strategy—for some reason, Kahn believes that he's one step ahead by keeping his competition off-balance. Heller confides, "Philippe once said to me, 'As long as they think I'm mad, we're at an advantage.'" Adds Stewart Alsop, publisher of the Redwood City, Calif., *PC Letter*. "Philippe loves keeping people

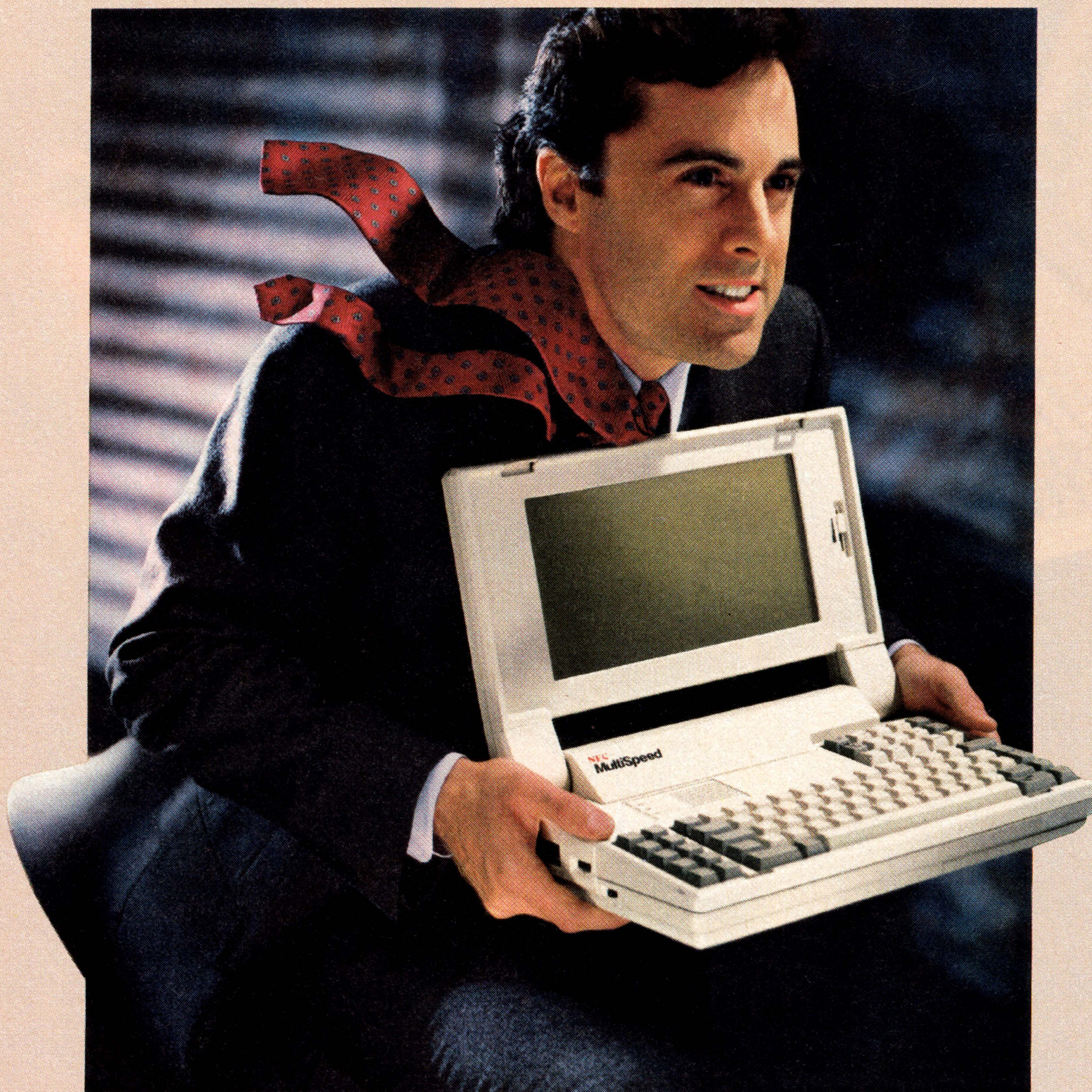
off guard. A lot of people think he's a flash in the pan, and he loves for them to think that."

And a third explanation involves vindication. Kahn truly operated at a disadvantage at the start, in part because he is a foreigner and could not get a green card, which would have allowed him to work legally in the United States. (He finally got one in October 1985, long after Borland was a going concern.) A few months before that day in October, negotiations between McGraw-Hill and Kahn, to have the large publisher acquire Borland, essentially fell apart.

That was the day the *Wall Street Journal* published a story about the

Frenchman on its front page, pointing out that he was an illegal alien. And that was but one of many rebuffs Kahn endured, according to attorney Berry. "He got insulted by just about everyone around in 1983," he recalls, "whether it was passively, by people who wouldn't return his calls; or actively, by some others who just proposed ridiculous deals to him; or very aggressively, by a couple of people who liked the company but didn't think he should be president. So at the moment he enjoys emphasizing how eccentric the company is." In reality, says Berry, Borland International is anything but eccentric: "It couldn't have succeeded if it were like that."

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(For More Information Circle 43)

When Kahn first started marketing Turbo Pascal by mail order in November 1983, for \$49.95, other versions of the Pascal programming language were selling for several hundred dollars. Because the magazine ads looked good and the software worked well, it quickly became a big success—and controversy ensued.

Of course, the move was hardly controversial with the people buying the product—what customer could argue with low prices? Dr. Paul Gallop, a Harvard Medical School professor and also head of the Laboratory of Human Biochemistry at Children's Hospital in Boston, was Kahn's first mail order customer for Turbo Pascal. Subsequent massive sales of Turbo Pascal launched the company. Gallop says that since then he has bought every new product the company has released. "I think Borland is great because they've forced prices down," he says.

But at the time, others felt Kahn had broken an unwritten agreement within the industry—that quality PC software of *any* kind should cost at least several hundred dollars. Therein lies the controversy: Did Borland force prices down or did the company create a new price level in the software market where some programs fit and others don't?

The answer depends very much on whom you ask. Ashton-Tate's president, Ed Esber, whose dBase and Framework products are priced at the high end of software used by a wide range of businesses, says flatly, "The reality is, people are paying for what they get."

Conversely, Bricklin, the designer of VisiCalc, says Kahn "showed that some products are completely mispriced." But asked if such best-sellers as dBase III and Lotus 1-2-3 are worth their \$500 or \$600 list prices, he says: "Yes. And so is Turbo Pascal: for certain users."

Bricklin argues that most users have one "main productivity program you sit with" all day long. "The main productivity program you're using, apparently, is going in the \$300 to \$800 range." For people who write computer software for a living, Turbo Pascal might be that program; for people who run a business off their computer, 1-2-3 might be that program. (In the early days of personal computing, customers would walk into computer retailers and, rather than ask for an Apple computer and Bricklin's program, would say, "I want to buy one of those VisiCalc machines." That's an

Borland helped force open the RAM-resident window with the pop-up concept employed in SideKick. The roaring success of the program has had a profound effect on how many other software makers design and execute RAM-resident programs.

extreme case, but the same idea.)

For his part, Bricklin, who is now president of Software Garden, Inc., in Newton, Mass., says the pricing of his most current product—Dan Bricklin's Demo Program, intended for software developers—is a direct result of the principles of pricing that Kahn established earlier. "I'm selling a product that most people (in the industry) feel should cost \$250, and I'm selling it for \$75," he says. "We felt it was the right price. There's a price people will pay even if they're not sure they're going to use the program, and that price is apparently less than \$100. And Philippe has gone for that."

Morton Rosenfeld's firm, Corporate Software, Inc., in Canton, Mass., was the first mail order retail business for large corporate purchases of software. "There's nothing magic in pricing," he states. "Some products are worth \$99 to a lot of people; other products are worth \$495 to a lot of people; and other products are worth \$495 to a few people. It's a question of pricing at a point where a customer gets value."

Obviously, a lot of customers believe there is value in Borland products—over 3 million packages have been sold. And though 1 million of those are SideKick and another half-million are Turbo Pascal, "the company is very unusual," says Morrow. "You see, Philippe doesn't have a single product that's responsible by itself for his company. Every other software company, except Microsoft, has one product—or one-and-one-half products, if you will—that provides the bulk of their income." Morrow says the integrated packages—Lotus's Symphony and Ashton-Tate's Framework—are, in combination with their original 1-2-3

and dBase programs, respectively, the "one-and-one-half" products of those two leaders.

"If you look at Borland, I think you'll find they have a wide variety of products, which are doing reasonably well," he concludes. "Their income is distributed through a dozen products now."

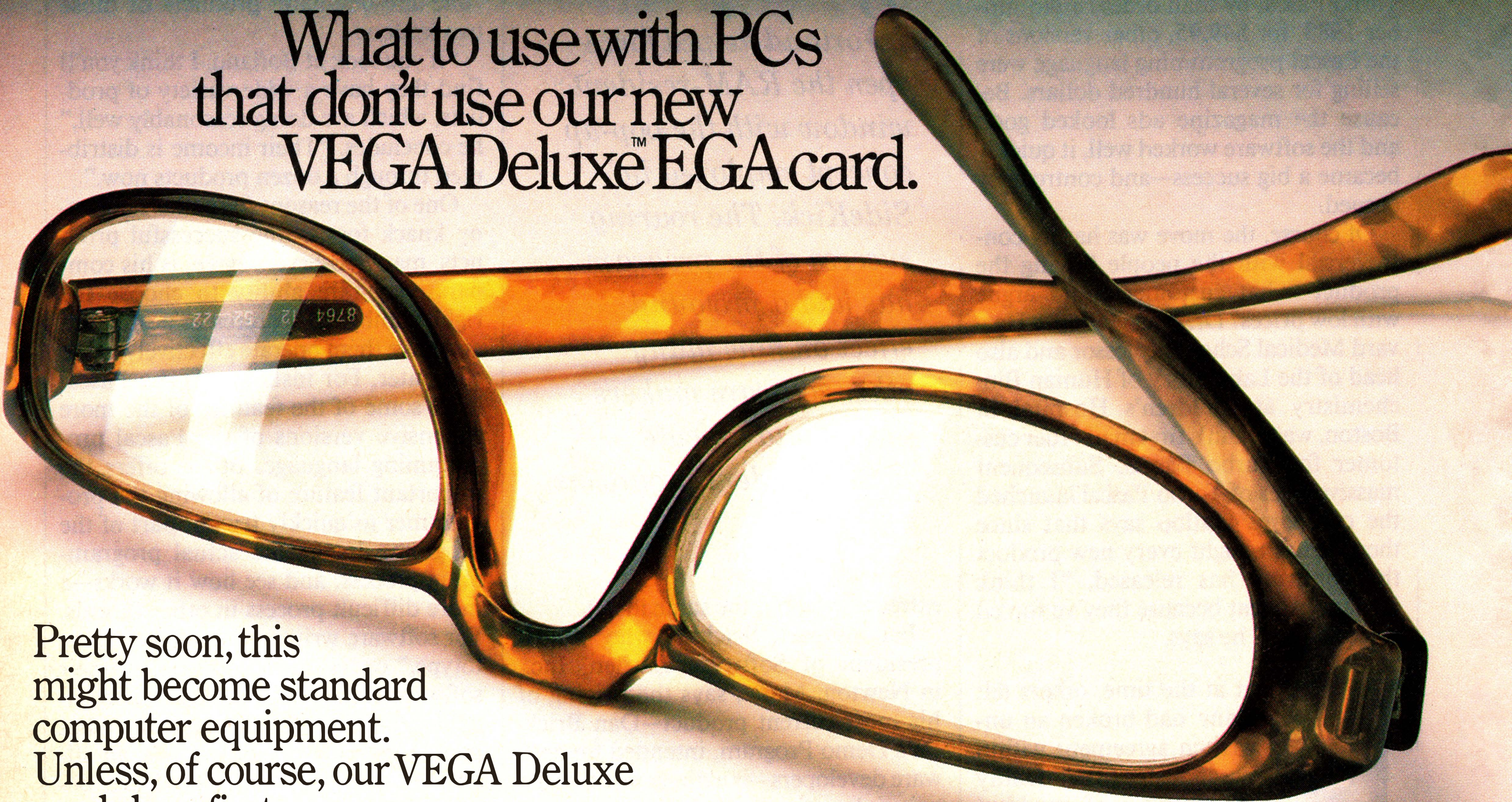
One of the reasons for Kahn's uncanny knack for issuing successful products, many observers agree, is his comparatively rare ability to choose the right number of features in a program and have them operate effectively in the computer. For instance, Turbo Pascal lacks some of the features of the more expensive versions of the Pascal programming language. But it offers the important feature of allowing the programmer to quickly try out part of the program, during the actual programming process, and see how it works—a more difficult process in other Pascals. For software writers who need to "prototype," or test-drive, portions of their software as they write it, this is an invaluable feature. "Understanding what people get out of software is an ill-defined and little-understood art, because it has such a short history," says observer Alsop. "Philippe is very good at that."

Another reason for his success is his pioneering ability to create new ways of doing things. The pop-up concept of RAM-resident software—popularized, though not invented, by Kahn—has affected the design of many other programs. It has pervaded the industry to the extent that some software companies, such as Living Videotext, producer of ThinkTank and Ready, produce and sell two versions of their program—one memory-resident, and one not.

What goes through Kahn's mind when he's working on a new product? He readily admits that he does not write all of the program code in each new product—"I write, but I'm a designer. I'm not the kind of guy who is going to write 100 percent of a product himself"—but he does have a deep enough knowledge of programming "to know what's going to work and what's not going to work, technically."

When designing a new product, or evaluating an existing one to acquire and market it (as he did with Reflex, a data base program), "I look at it as a user," he says. He asks basic questions: "Will I use this? Does it make sense?"

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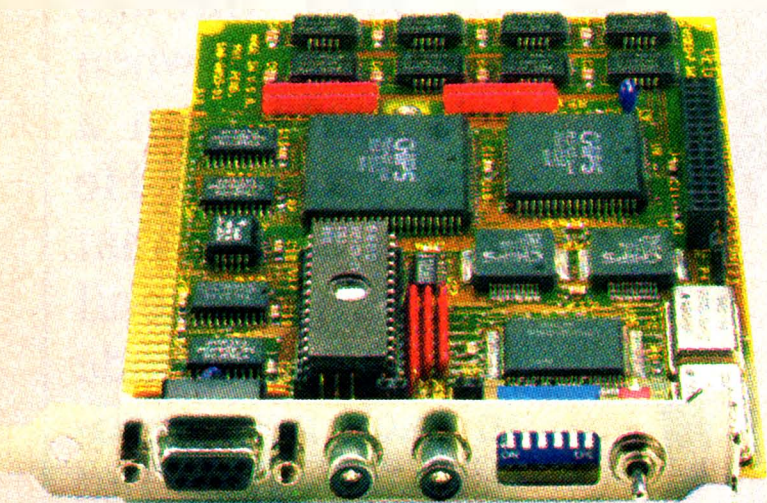
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He points at his original SideKick to explain the logic behind the product. "Imagine I'm in the notepad," he says, "and I want to get to the calculator. If I know SideKick well, I'll type Alt-C to get to the calculator. But if I don't remember how to get to the calculator, then I will leave my finger on the Alt key, and after a few seconds, the pop-up menu pops up. Then I can get to the calculator using the scroll bar."

That's an example of what Kahn calls a "two-level user interface," which is, in the jargon of the industry, "intuitive." He explains one of his main rules for product design, which has won him both high sales figures and imitation by other software designers: "Even if I don't have an instruction manual, I've got to be able to figure it out. Things have got to be logically organized."

This is the sober, well-behaved side of Kahn—logic and order—coming into play. "Compare a program to a filing cabinet," he says. "Some programs, they have all the ideas, and everything you want to do with them, you can. But everything is just tossed into the filing cabinet with no order."

"And what I like," he explains, "is to have everything perfectly filed in its place, so when you look for something, you just find it."

For the future, Kahn will once again try to blaze a trail throughout the industry with his concept of the "soft user interface"—a feature of an as-yet-unnamed business product to be released this year. "Instead of telling the user how we want him to use a software product," he says, "we'll make the software product's user interface flexible enough so that the user can modify it or make it suit his own needs." For example, if you want to use the F1 key for help, you can specify that; if you prefer to use the F1 key for exiting the program, you can change the program yourself to make it do that.

Borland is gradually gravitating toward the Apple Macintosh as a new market for its software. Already, there are three products: Turbo Pascal, Reflex, and SideKick, for the Mac. The company is attempting to woo users with improved Macintosh versions of its existing line of MS-DOS products—improved to have more features than their MS-DOS counterparts, and having the more visual interface which is part and parcel of the Mac. For example, the new SideKick for the Mac, release 2, incorporates a spreadsheet pro-

The material rewards of success now include a company-owned Porsche 928, a house with a hot tub, and a sailboat. Kahn also helped to bankroll the recent unsuccessful America's Cup bid by the Heart of America yacht-racing syndicate.

gram with graphics and an outlining program.

Kahn says, "A heck of a lot of people have an interest in the Mac," and promotes the Mac Plus, with its upgrades over the original Macintosh—such as a hard disk option and increased speed—as "last year's biggest hardware achievement" because "it really affirmed an alternative to the MS-DOS world."

Kahn's unusual success with most programs has made some of his lesser accomplishments stick out like a sore thumb. His predictions in print about Turbo Lightning—a system of on-line reference products that began with a spell checking program and has not been succeeded in short order by the series of follow-on products that Kahn promised—has led to some ribbing. In one magazine, Kahn was quoted as promising he would "do whatever it takes to make Lightning the standard knowledge retrieval system." Bricklin calls the lackluster sales the "embarrassment of embarrassments." Kahn, annoyed, responds, "Yeah, it's funny that people expect complete miracles from Borland," adding, "So, we can do miracles, but only one or two a month."

He says that he still plans to do all the things he promised in the past—including putting reference works such as *Black's Dictionary of Law* and *Bartlett's Familiar Quotations* in a Lightning-and-compact disk/read-only-memory (CD-ROM) package, but he won't say when. "I'm not going to give a time frame again, because I got burned with it," he says.

By and large Philippe Kahn has been an unqualified success—largely by his own hand, and certainly on his own terms. Tim Berry, a Palo Alto, Calif.,

computer industry consultant, helped Kahn finalize the first version of his initial business plan—which, ironically, was never funded. In the beginning, users, through their purchases, provided the lion's share of Borland's operating capital, since most venture capitalists refused to invest in Kahn. Berry says "I was close enough to the beginnings to know that the real driving force behind Borland was Philippe Kahn. It was his concept that made the company. He wasn't just lucky, or using somebody else's ideas."

And now, Kahn has all the material rewards of a successful entrepreneur—a 1985 Porsche 928, which is a company car; a sailboat; a house with a hot tub; and, most important, perhaps, for him, all the computers and software he wants to play with. Borland's success also enabled it, and Kahn, to help sponsor Heart of America in the America's Cup trials. The crew, who didn't make the finals, came to Kahn's attention after calling Borland for help with Reflex.

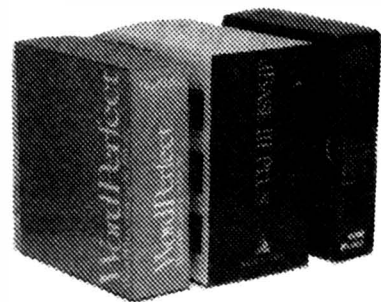
"He's not where he expected to be," says Bricklin, "so basically, it's all found money. He's under incredible pressures, because so much is expected of him. So he might as well enjoy it."

"The goal was to be able to build quality products, and give quality service, and make a decent living at it. The goal of me starting the business was never to make millions," Kahn says.

"I think the reason we're making money is, we never really tried to. The goal was to do something I liked, and have other people associated with it," he says. "And we've been successful. I think that's the best assurance you can have for your customers and shareholders, to do things like that. Because in the long run, I think, it pays off." ■



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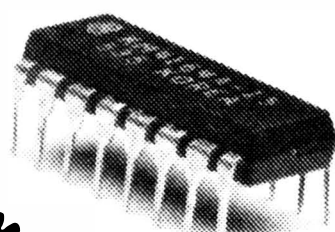
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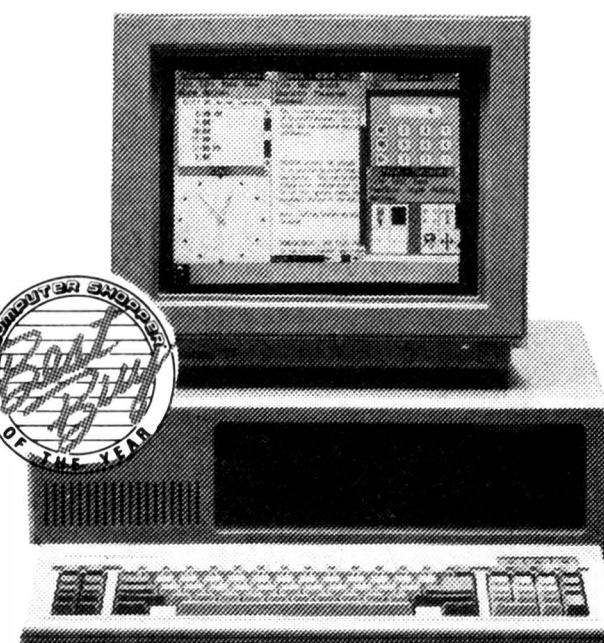
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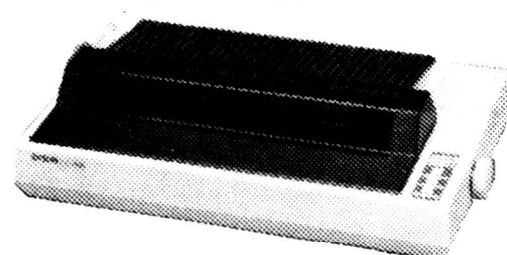
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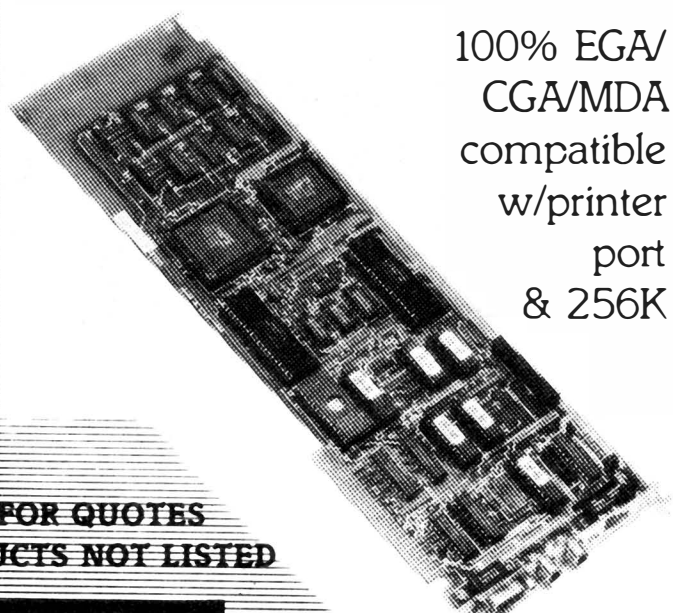
Amdek 310A Amber TTL Monitor	\$130.00*
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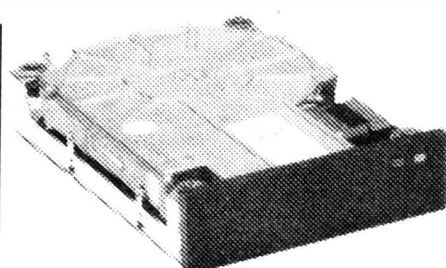
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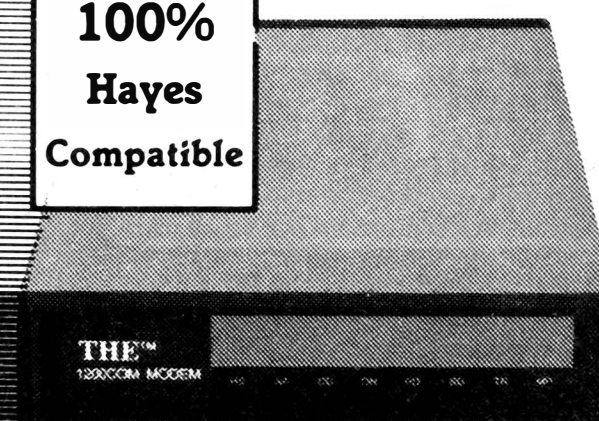


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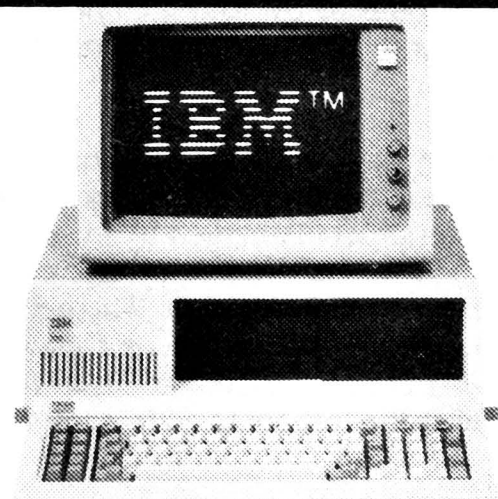
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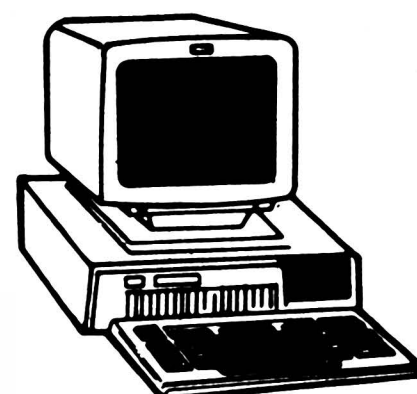
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UNITED STATES BANKRUPTCY COURT DISTRICT OF MASSACHUSETTS

In re)
SUPPRESSION DEVICES CORP. f/k/a)
ELECTRONIC PROTECTION DEVICES,) No. 84-681-JG
INC.,) (Chapter 11)
Debtor)

NOTICE OF ORDER ESTABLISHING BAR DATES FOR WARRANTY CLAIMS

PLEASE TAKE NOTICE that an Order Barring Warranty Claims and Providing for Notice of Same has been entered and pursuant to said Order:

1. That, except as otherwise specifically provided in this Notice, any and all claims by any person or entity ("Claimant") against Debtor (i) arising from any warranty express or implied of products sold by Debtor to anyone prior to February 20, 1985 ("Debtor's Products"), and (ii) regardless of when or whether Claimant purchased the given item of Debtor's Products directly from Debtor or from some other vendor (the "Warranty Claims"), are forever barred and may not be the subject of any action in this or any other forum.

2. That Claimant may select either Option A or Option B below (but not both), and selection of one Option shall operate as an irrevocable bar to invocation of the other Option:

OPTION A

If Claimant wishes to preserve whatever rights it may have to obtain any one or more of the following remedies (the "Normal Course Remedies"): (i) repair; (ii) replacement; (iii) payment or other value (as by repair of computer equipment damaged by failure of Debtor's Products) of up to a maximum amount of \$2,500 for each Warranty Claim under Debtor's performance warranty, Claimant must deliver written notice of its Warranty Claim with proof of actual damages to Electronic Protection Devices, Inc., a Delaware corporation, 35 Dunham Road, Billerica, Massachusetts 01821 ("EPD-Del"), so that such written notice and proof are received by EPD-Del at the foregoing address before 5:00 p.m., EDT, June 30, 1987.

OPTION B

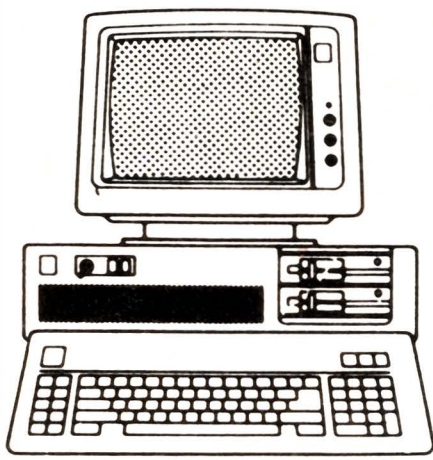
If Claimant wishes to preserve whatever rights it may have to obtain any form of relief other than the Normal Course Remedies specified in Option A, Claimant must file a proof of claim against the Debtor before 5:00 p.m., EDT, April 15, 1987 with Clerk, United States Bankruptcy Court, 1101 Boston Federal Office Building, 10 Causeway Street, Boston, MA 02222-1704.

3. That nothing in this Notice shall be deemed to constitute EPD-Del as, or to imply that EPD-Del is, a successor to the Debtor generally responsible for Debtor's liabilities. EPD-Del is hereby assuming no debts, liabilities or other obligations of Debtor other than Warranty Claims seeking the Normal Course Remedies set out in Option A above.

Debtor estimates that on or before March 31, 1985, end users had purchased more than 95 percent of Debtor's Products (which are not to be confused with those products that have been sold or are being sold now by the Delaware corporation known as Electronic Protection Devices, Inc., and referred to herein as EPD-Del). Any purchaser who believes he purchased one of Debtor's Products and may thereby be affected by said Order is urged to respond to this Notice regardless of the date of his purchase. For further information, call or write Debtor's attorney, Peter Nils Baylor, Esq., Nutter, McClennen & Fish, 600 Atlantic Avenue, Boston, MA 02210, phone (617) 973-9700.

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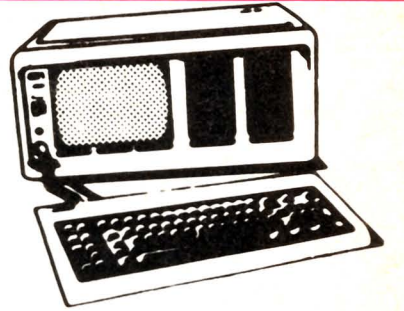
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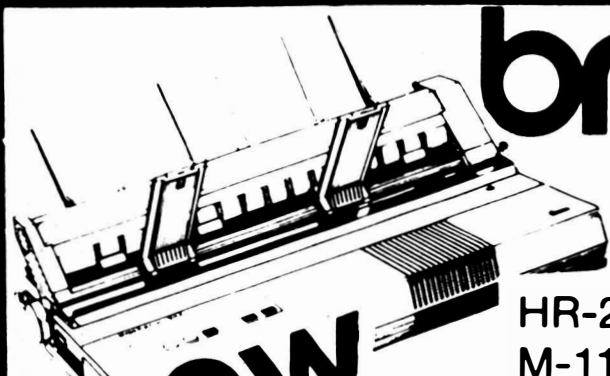
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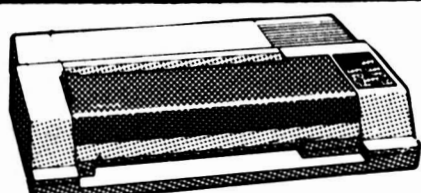
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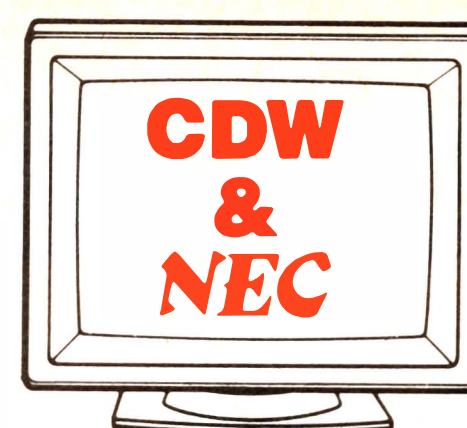
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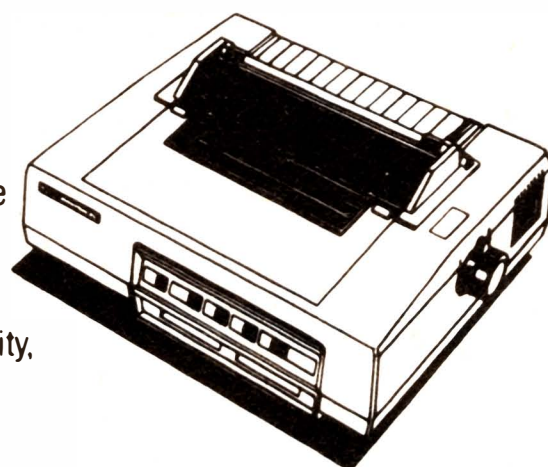
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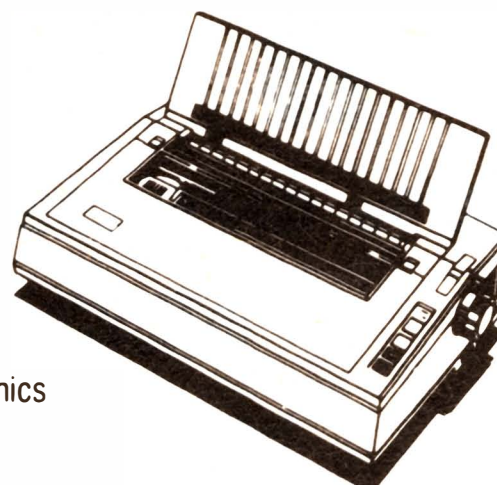
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Options:

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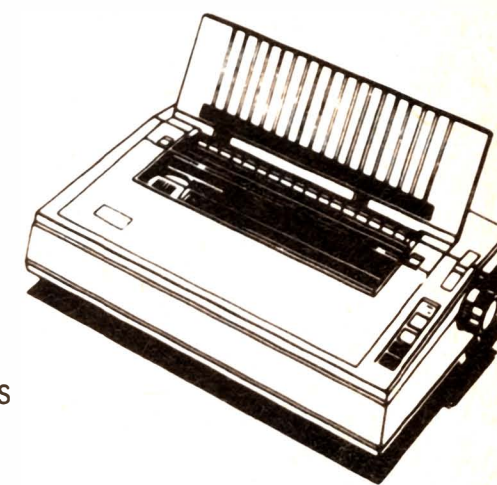
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- 65 cps Letter Quality
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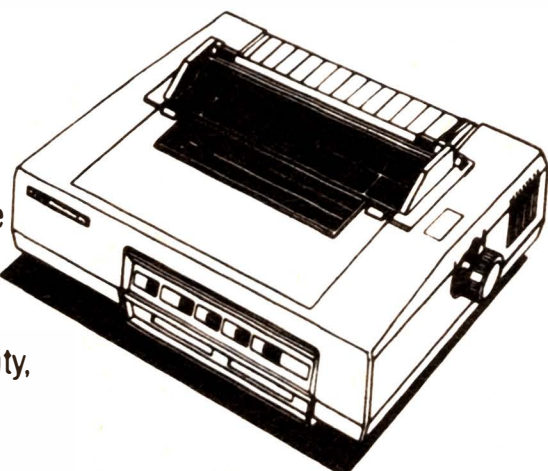
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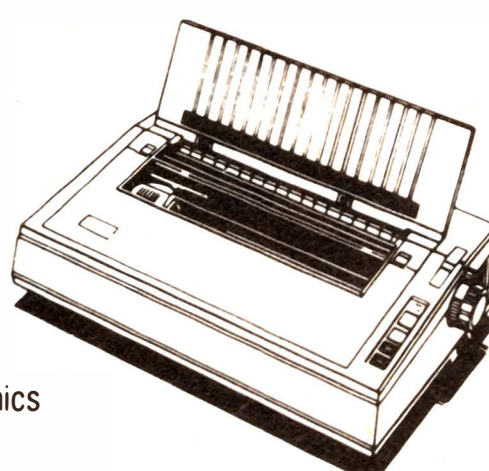
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- IBM Character Set
- 360 x 360 per inch Graphics

Options:

- Bidirectional Tractor Feed
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- Serial Interface



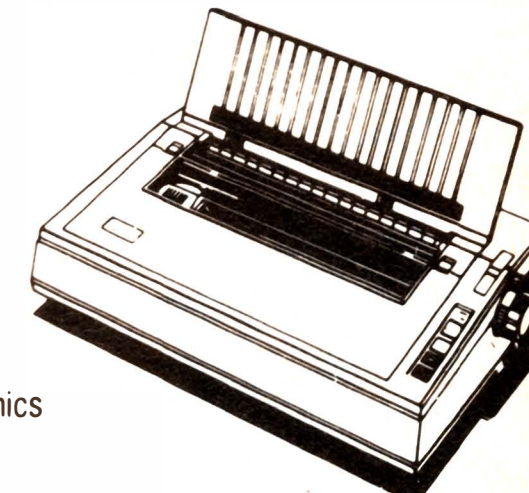
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- 20 Resident Fonts
- IBM Character Set
- 360 x 360 per inch Graphics

Options:

- Bidirectional Tractor Feed
- Single Sheet Feeder
- Serial Interface



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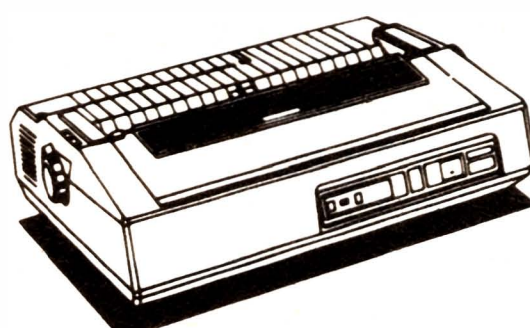
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- 10, 12, 15 Pitch Proportional Fonts



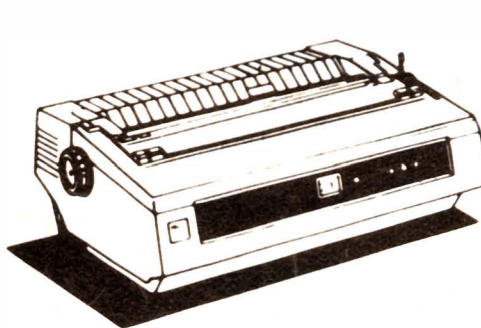
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- Up to 128 Character Daisy-Wheel Printer
- 30 cps—12 Pitch Text
- Bidirectional Printing
- Bidirectional Paper Feed
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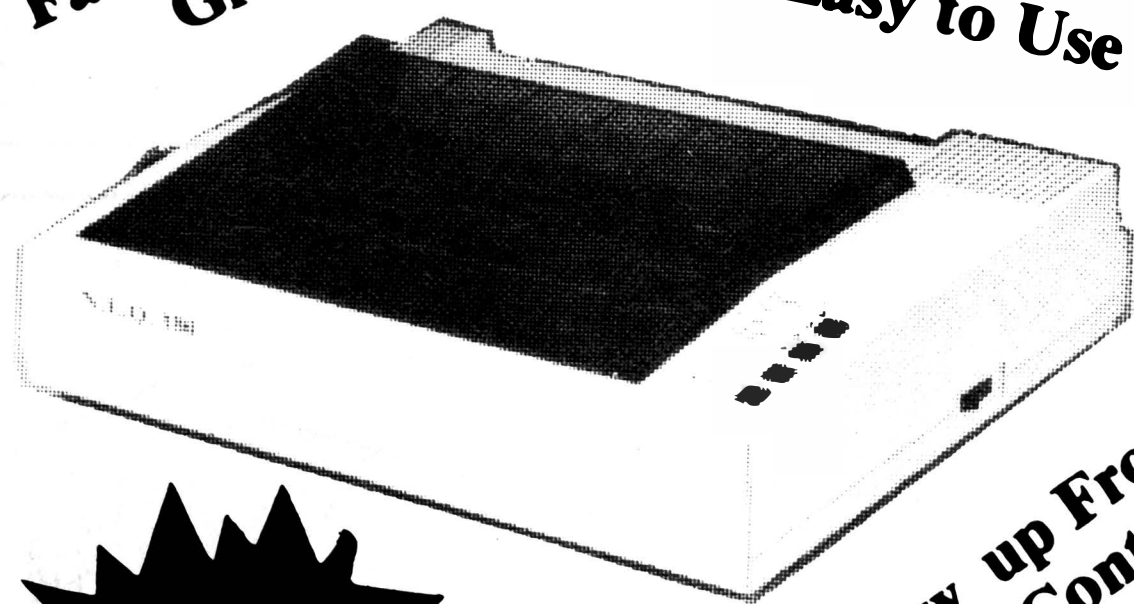
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8K bytes utility buffer

Printing Direction

Text Mode — Bi-directional

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Interface

Centronics type parallel (8-bit)

Paper

Plain paper, Roll paper, Single sheet

Fanfold, Multipart paper: max. 3 sheets
(original plus 2 copies)

Character Fonts

Pica, Elite, Italics, Condensed

Printing Method

Impact dot matrix

Printing Speed

160-180 CPS at standard character printing

Printing Characters

Standard 9 x 9 dot matrix

NLQ 12 x 18 dot matrix (33cps)

Character size: 2.12 x 2.8 mm (standard)

Character sets: Full ASCII character set (96)
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Ribbon Life: 3 million characters/cartridge

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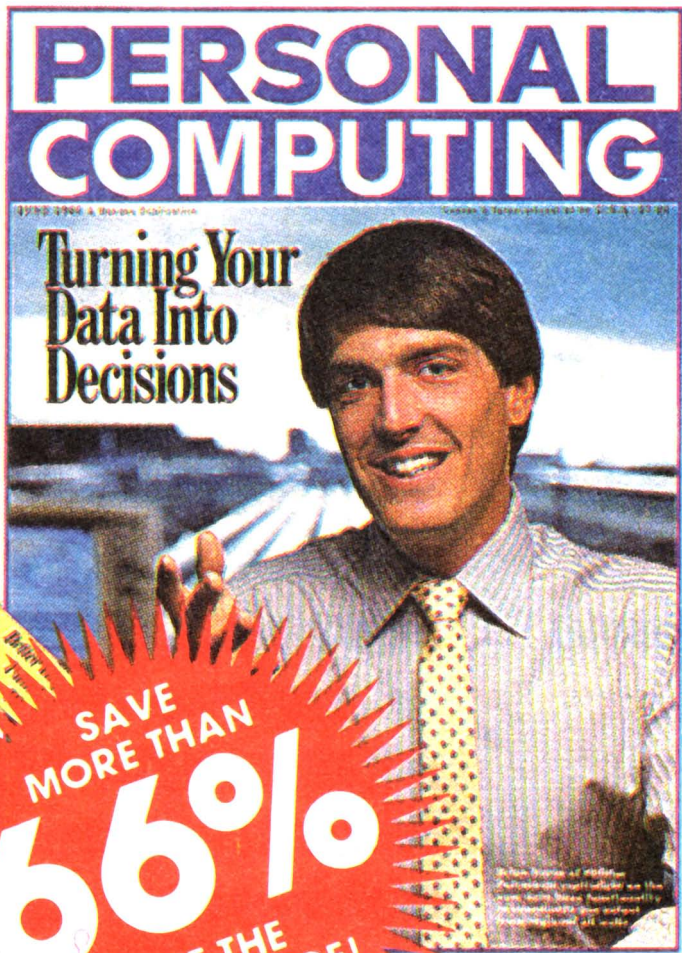
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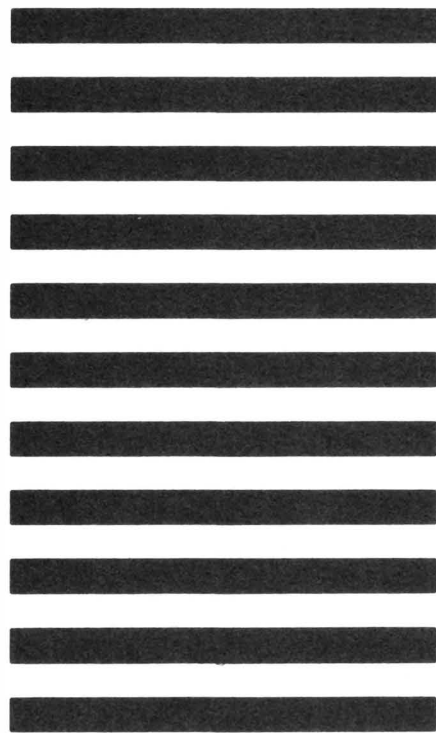
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Xtree	\$27
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Leading Edge W/P w/Spell & Mail	\$32
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Multimate Advantage	\$299
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CWS-187

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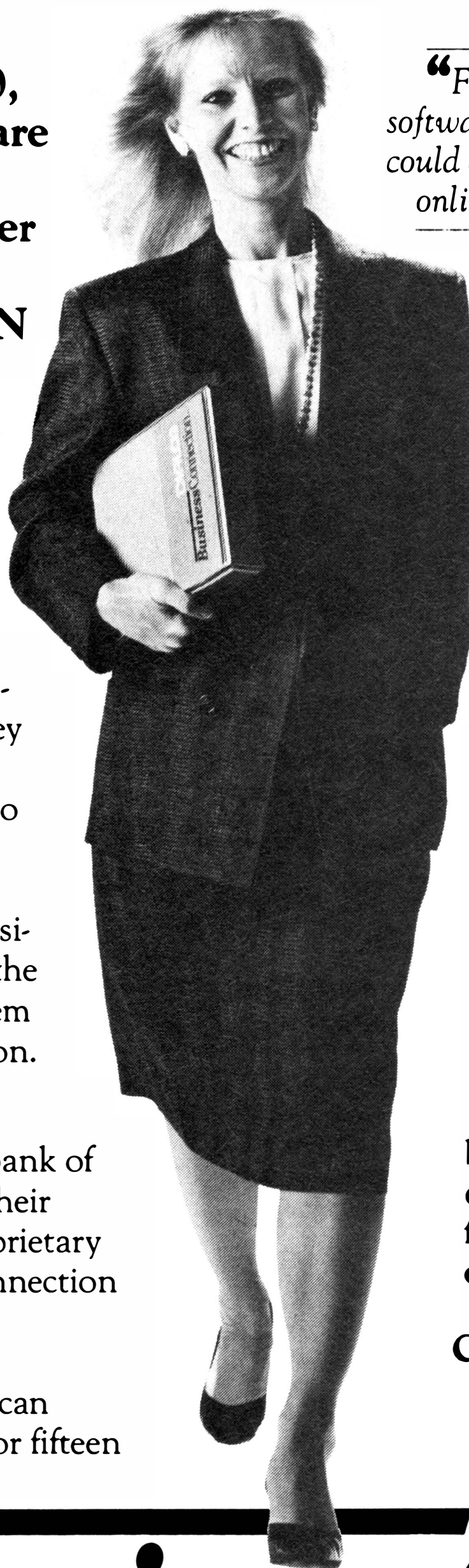
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(For More Information Circle 76)

SPREADSHEET ADD-ONS

by Suzanne Quigley

Not so long ago, all that was expected of a spreadsheet was that it serve as a what-if tool, calculating relationships between variables. But the more financial analysts, engineers, business people, and a growing number of other users came to depend on the spreadsheet, the more they began to feel the need to add features. At first, these took the form of elaborate scripts, or macros, that individuals would write to help speed up their work. Later, commercial products began appearing to enhance the capabilities of such core programs as Lotus 1-2-3, Symphony, SuperCalc 3, MultiPlan, PFS:Professional Plan, Framework, and VP Planner.

For the experienced spreadsheet user, a utility program that, for example, can print sideways, link spreadsheets, attach notes to cells, or add word processing features is becoming more of a necessity than a luxury. These utilities add considerable value to the already indispensable spreadsheet, enabling the user to create larger and more complex documents.

Add-ons are continually expanding in capability. For \$50 to \$200, users can now transform a spreadsheet program into a "software operating environment," a term coined by Rick Gibson, executive director of the Consortium, Inc., a marketing, development, and information source for the 1-2-3 aftermarket, and the chairman of 4-5-6 World, a national direct-mail-order house for, and reseller of, 1-2-3 enhancement products. Such a software operating environment supplies a combination of such functions as spreadsheet, word processor, data base, and graphics. No longer does the user need to leave the spreadsheet to perform

other applications; with the addition of utilities, everything can be done from within the worksheet.

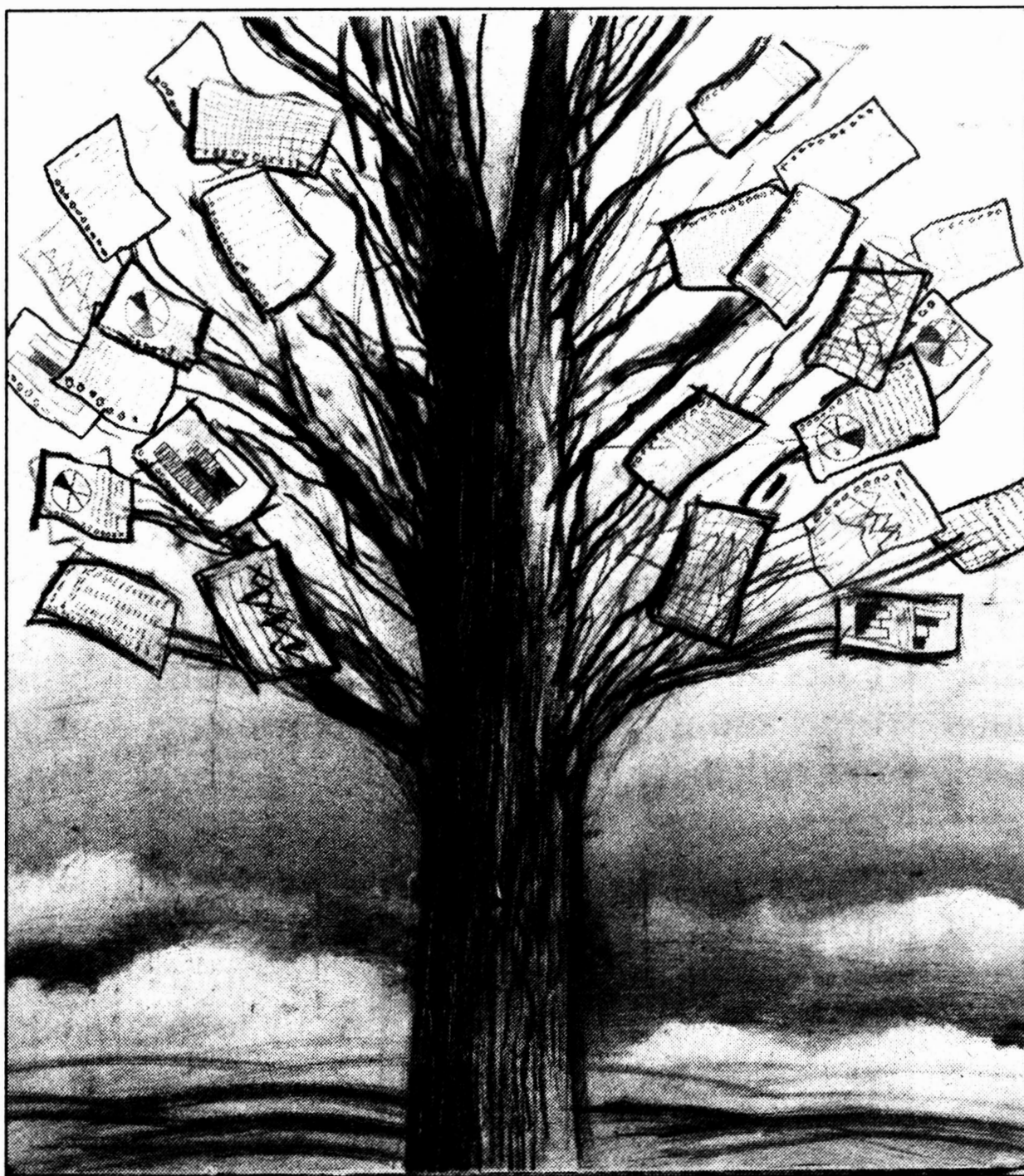
Lotus 1-2-3, with more than 2 million users, offers a massive installed base for add-ons. Now a user can wrap words to create longer documentation, link spreadsheets, list relations between formulas, and analyze the entire range of what-if possibilities to recommend the

ment for add-on packages. When they developed these programs, they stuck to the basics, leaving plenty of room for enterprising software manufacturers. The evolution of a product such as 1-2-3, Gibson says, "has actually been caused by the revolutionary inventions by independent software manufacturers."

There are a thousand or so add-on products on the market designed to enhance spreadsheets, too many for a single listing. We have concentrated on utility add-ons priced at less than \$150. We excluded templates, which are products with formatting commands and macros that are loaded into the spreadsheet, providing a dedicated application such as accounts receivable. Instead, we concentrated on products such as word processing add-ons and print utilities, that work in harmony with the core spreadsheet to enhance its capabilities. The categories we chose include spreadsheet auditing, general utilities, graphics, macros, printing, and text editing.

Among the many spreadsheet add-ons on the market, the trend is toward word processing, communications, and RAM-resident applications. RAM residency is becoming increasingly important because the spreadsheet itself remains in memory. A spreadsheet user can punch a hot key, perform a function, then return immediately to the spreadsheet.

There are over a thousand add-on products available, and each appeals to the needs of the variety of users who employ spreadsheets in their daily business. Spreadsheet utility products for business applications include the Professional Real Estate Analyst, Ready-to-Run Accounting, Timeslips, and XYZ Query.



best result for a given set of goals. In the software marketplace, where a new product may cost the user up to \$500, spending \$50, \$100, or \$150 for increased functionality is a price many users are glad to pay. To these users, the core spreadsheet is like a home that an owner adds rooms to, increasing both the value and the usefulness of the home.

The creators of spreadsheets such as SuperCalc, Symphony, and especially 1-2-3 inadvertently created the environ-

The Professional Real Estate Analyst is a RAM-resident package that is fully menu driven, performing cash-flow analyses, income statement generation, and evaluation of both residential and commercial properties. The package also reflects recent changes in the tax laws. With this utility, a user can easily create a five-year cash-flow analysis and provide reports in formats used by the Real Estate National Marketing Institute.

For those business people who need to link and summarize multiple worksheets, utility packages such as XYZ Consolidate and XYZ Query are good choices. The user who needs to treat worksheets as a multidimensional data base, or summarize and consolidate different worksheets, will find either of these add-on tools useful. For \$145 per title, the sophisticated spreadsheet user can both summarize and compare multiple spreadsheets with Consolidate and treat these worksheets as a single data base, extracting data from them easily with Query.

Utility products such as Hal are designed to make working with a spreadsheet much easier. Hal, an enhancement product exclusively for 1-2-3, allows users to substitute English language phrases for 1-2-3 commands, while adding some new options: undo the last command, list relations between formulas, and even link multiple spreadsheets.

Spreadsheet users who wish to convey information created in their worksheets with the aid of bar graphs, pie charts, and the like are relying heavily upon graphic add-ons. Business people have come to appreciate the value of visual presentations in conveying data, and companion products such as Datasurf version 1.2 and Schedule Grafix version 2.0 are making things very much easier. With Datasurf version 1.2, a manufacturer can dramatize the growth of his or her product line by producing some three-dimensional graphics and charts from data tables built by the spreadsheet. Schedule Grafix version 2.0 advances visual presentations a step further by generating presentation quality schedules. Most graphic utility packages on the market support most popular dot matrix and laser printers, so high-quality bar graphs, pie charts, and schedules can be produced quickly and easily.

Among products that can work with text, 4Word, Note-it, and Ready are three RAM-residents that have attracted some attention. 4Word is a true add-in tool. Unlike most RAM-resident pro-

grams that pop up on the screen when a hot key is pressed, 4Word is integrated directly into the spreadsheet. Developed using the newly created 1-2-3 Developer Tools from Lotus Development Corp., this utility actually becomes part of 1-2-3, sharing resources with the spreadsheet. The 1-2-3 Developer Tools enable software developers to make products that will offer seamless integration with 1-2-3. These products nestle into 1-2-3 and require minimal RAM. Like stand-alone RAM-residents, they are activated

tions, pop-up notepad, appointment calendar, and calculator. For any 1-2-3 or Symphony user, this collection of macros should make life easier. KeyMac allows the frequent worksheet builder to capture keystrokes in a buffer, converting them into their macro equivalent.

Equally important to many spreadsheet users are those generic add-on utilities that make saving, protecting, and rescuing spreadsheets a simple process. Packages that can save spreadsheet data at regular intervals, reformat the data

into a spreadsheet, protect worksheets by assigning passwords, retrieve and recover some lost or corrupted spreadsheet data, and add memory without an expanded memory board are some of the luxuries available. Though none of these packages is a real requirement for working with spreadsheets, each does make life with a computer a little more secure.

Printing utilities are the most consistently popular spreadsheet utilities. SideStep, Sideways, and Twist and Shout all allow users to print their worksheets sideways. For no more than \$70 each, these programs enable users to rotate spreadsheets sideways, produce varied typefaces, and access most printers.

Because these utility packages provide extra power and flexibility, frequent spreadsheet users have come to appreciate and demand them. As a result, Rick Gibson predicts a dozen new products in the first quarter of 1987.

Among these new products are add-in utilities that make use of the Lotus 1-2-3 Developer Tools. Like 4-Word, these utilities work in harmony with 1-2-3, providing features like 1-2-3-style menus and single-keystroke commands.

Some of the new entries include Softbridge Unity, a 1-2-3 integrator by Softbridge Microsystems Corp.; InWord and Noteworthy, a word processor and a cell annotator made by Funk Software; PlusWords, a word processor from Amazon Systems, Inc.; CatSup, a worksheet retrieval utility from Applied Decision Technology; Write-In, a word processor from Blossom Software Corp.; Informix Datasheet Add-In, a data base from Informix Software, Inc.; Kelpro, a financial projection system from Kel Systems Inc.; and SeeMore, a worksheet display utility from Personics Corp.

With such a steady influx of utility packages, a saturation of products is a distinct possibility. As that point approaches, the actual needs of users will determine which products succeed.

**Spreadsheet utilities
provide the
extra power and
flexibility that
spreadsheet users
have come to
value and demand.**

with a single keystroke, but they are much less likely to cause memory conflicts and system crashes.

Note-it allows a user to attach Post-It style notes anywhere in a spreadsheet, with up to a hundred note cards per worksheet; then it searches through the notes for familiar words or phrases. The notes can be displayed or printed at any time, and if the user moves the contents of a cell, the note goes along with it. For a sales manager who needs to create complex worksheets of regional sales, for example, Note-it could prove invaluable; any comment or question to his or her sales staff will be attached directly to the worksheet for later revision.

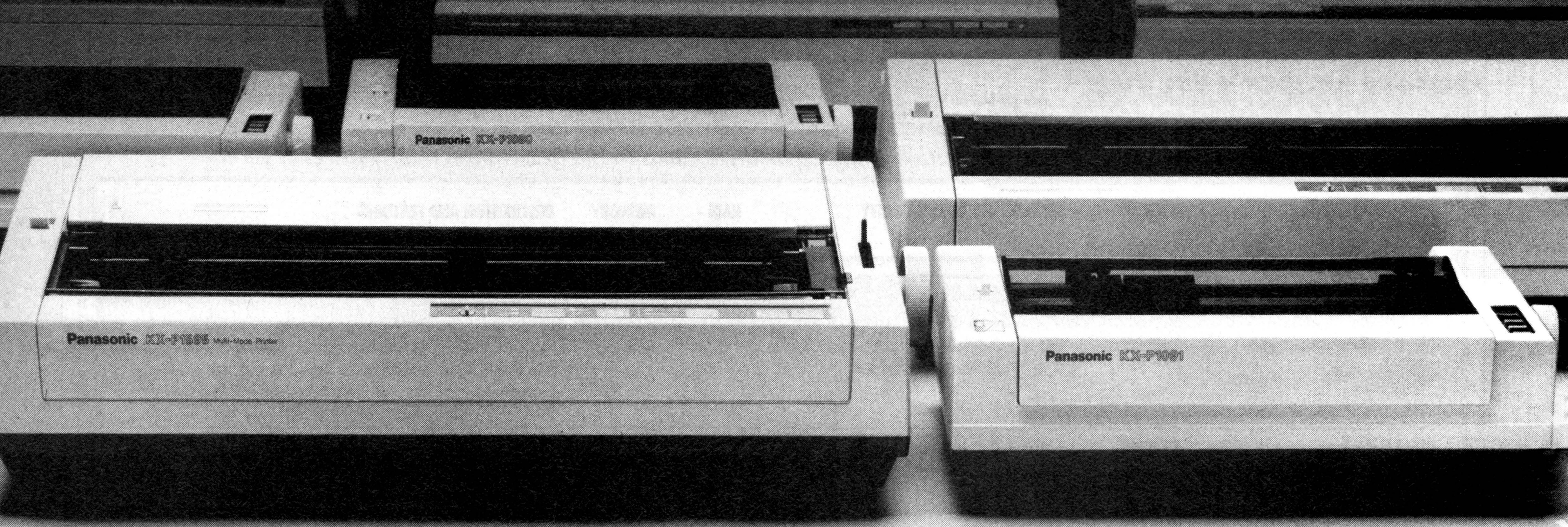
Ready is a RAM-resident outline processor (it also works with applications other than spreadsheets) that would enable this same sales manager to organize facts and ideas in outline form. Ready could help design a worksheet, since it can empty an outline right into the core spreadsheet. An appointment calendar is also included in the program.

Among macro utilities, 101 Macros and KeyMac offer increased functionality at nominal cost. 101 Macros is a collection of such macros and utilities as word processing, graphics, math func-

SPREADSHEET ADD-ONS The products below provide extra capabilities for spreadsheets. The spreadsheet compatibility column indicates which spreadsheets listed will work with the corresponding add-on utility. RAM-resident add-ons are so designated in the RAM-residency column; additional information is listed in the description and features section.

PACKAGE/Company	PRICE	SPREADSHEET COMPATIBILITY	RAM - RESIDENT	MEMORY REQUIRED*	DESCRIPTION AND FEATURES
APPLICATIONS					
Goal Seeker <i>Brown Bag Software</i>	\$69.95	Lotus 1-2-3 (all versions); SuperCalc 3,4; MultiPlan; VP Planner	Y	40k	A goal-seeking program; manipulates cells to achieve the predefined result; uses 1-2-3-like commands; sets parameters of the goal; includes macros and templates for each separate spreadsheet
Goal Solutions <i>Enfin Software Corp.</i>	\$79.95	Lotus 1-2-3 (all versions up to release 2.1)	Y	60k	A goal-seeking program; features backward projections; allows simultaneous seeking of multiple goals; 1-2-3-style menu; pop-up windows
Professional Real Estate Analyst <i>Coral Software</i>	\$149	Lotus 1-2-3 release 2.1	Y	100k	Fully menu-driven; provides an income and expense report, five-year cash-flow analysis, and reports in RNMI (Real Estate National Marketing Institute) formats; calculates before-and-after tax rate of return, internal tax rate of return, future wealth, and net present value; evaluates both residential and commercial properties; updated to reflect current tax laws
Timeslips <i>North Edge Software Corp.</i>	\$99.95	Lotus 1-2-3 (all versions); SuperCalc 3,4; MultiPlan; Symphony; Framework; PFS:Professional Plan; VP Planner	Y	49k	Time and Billing system, does time tracking and recording; downloads directly into spreadsheets; user-defined reports; includes bar graphs and pie charts
What's Best 1.2 <i>General Optimization</i>	\$149	Lotus 1-2-3 release 1A, 2, 2.01; Symphony 1.1 and higher; SuperCalc 4; VP Planner	N	256k	Analyzes a range of what-ifs to recommend a choice for a given set of goals; does mathematical optimization, dual-value capability, reduced costs, and shadow prices; creates vector product formulas
XYZ Consolidate <i>Intex Solutions, Inc.</i>	\$145	Lotus 1-2-3 (all versions), Symphony (all versions)	N	256k	Summarizes and compares multiple worksheets; customizes consolidation rules across worksheets; matches line items across different worksheets; offers roll-up options for consolidations
XYZ Query <i>Intex Solutions, Inc.</i>	\$145	Lotus 1-2-3 (all versions), Symphony (all versions)	N	256k	Treats multiple worksheets as a multidimensional data base; scans and extracts information and reports to either printer, screen, or new worksheet
XYZ Spread <i>Intex Solutions, Inc.</i>	\$145	Lotus 1-2-3 (all versions), Symphony (all versions)	N	256k	Transfers and links data across spreadsheets, showing source and target on-screen; performs downward allocations
AUDITING					
Cambridge Spreadsheet Analyst <i>Cambridge Software</i>	\$89.95	Lotus 1-2-3 (all versions), Symphony (all versions)	N	100k	Automatically searches through spreadsheets for problems or potential problems; shows all places where a chosen cell, range, or function is used, and includes an interactive debugging probe; provides analytical tools for exploring logic of a spreadsheet; provides reports for documentation; offers condensed map view for discerning patterns in a spreadsheet
Cell/Mate 1.2 <i>Clarity Software Corp.</i>	\$89	Lotus 1-2-3 (all versions), Symphony (all versions)	N	170k	Provides automatic documentation and error checking of spreadsheets by using the row labels and column headings already in the worksheet; documents circular error paths; shows all dependencies of a cell; shows all formulas that flow into a specific cell
The Spreadsheet Auditor 3.0 <i>Computer Associates Int'l, Inc.</i>	\$149	Lotus 1-2-3 (all versions), Symphony (all versions)	Y	256k	Analyzes and tests for spreadsheet accuracy and reliability; offers interactive error checking, pop-up cell notation, sideways printing, index reporting, relationship analysis, split screen viewing, map view, and range reports.
GENERAL UTILITIES					
Disk Optimizer 2.0 <i>SoftLogic Solutions</i>	\$59.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, PFS:Professional Plan	N	128k	Ensures that files are stored in contiguous clusters on the hard disk; displays the number of clusters to be moved; puts spreadsheet fragments into a continuous mode
Hal <i>Lotus Development Corp.</i>	\$150	Lotus 1-2-3 (all versions except 1.0)	Y	512k	Enhancement product for 1-2-3; allows users to substitute English phrases for 1-2-3 commands and undo the last command; provides spreadsheet auditing analysis; lists relations between formulas; links spreadsheets; runs only with 1-2-3, requiring a total of 512k of system RAM to load both programs

*If the program is RAM resident, "memory required" refers to the actual memory consumed by the software; for non-resident software, this figure refers to the minimum system RAM required to load the program.



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Panasonic
Office Automation 

(For More Information Circle 12)

PACKAGE/Company	PRICE	SPREADSHEET COMPATIBILITY	RAM - RESIDENT	MEMORY REQUIRED*	DESCRIPTION AND FEATURES
GENERAL UTILITIES (Cont.)					
Micro-VMS 1.0 <i>Vericomp</i>	\$75	Lotus 1-2-3 release 2.0, 2.1; Symphony 1.1 or higher; SuperCalc 3 (release 2.1), 4; Framework II	Y	70k	Simulates the Lotus/Intel/Microsoft expanded memory specification by entering data in a computer's hard disk or extended memory; enables users to build larger spreadsheets without additional hardware
SQZ <i>Turner Hall Publishing</i>	\$79.95	Lotus 1-2-3 release 1A, 2.0; Symphony; VP Planner	Y	30k	Compresses spreadsheet files; reduces size of spreadsheets by 80 to 95 percent when saving them to disk; sends spreadsheets in compacted form; "squeezes" multiple spreadsheets at one time; enables users of 1-2-3 1A to do password protection on files
Templates of Doom <i>Solar Systems Software</i>	\$49.95	Lotus 1-2-3 release 1A, 2.0; SuperCalc 4; VP Planner	N	256k	Learning tutorial to test and improve 1-2-3 abilities and to help users understand 1-2-3 commands by challenging them with puzzles that require 1-2-3 commands and formulas (among them are sorting a column of names, creating formulas, formatting cells or moving blocks of numbers); has four skill levels
Your Move <i>Goldata Computer Services, Inc.</i>	\$79.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, Framework, VP Planner, PFS:Professional Plan	Y	30k	Transfers spreadsheet files to software programs without requiring rekeying; macro capability allows users to define single-keystroke macros; transfers data from applications software to spreadsheets
GRAPHICS					
Datasurf, version 1.2 <i>Bridge Software</i>	\$128	Lotus 1-2-3 release 1A, 2.0; Symphony (all versions); SuperCalc (all versions); MultiPlan; VP Planner; PFS:Professional Plan	N	320k	Produces three-dimensional graphs and charts from data tables; produces high-resolution graphics; offers plotter quality with a dot matrix; supports most plotters and dot matrix printers
Easy Color for Lotus 1-2-3 <i>The Binary Workshop</i>	\$49.95	Lotus 1-2-3 (all versions)	N	256k	Rewrites screen drivers of spreadsheets to provide control over 16 screen colors; changes the color of the background, foreground, protected ranges, pointers, graphs, and unprotected cells; is EGA compatible
Easy Color for Symphony <i>The Binary Workshop</i>	\$59.95	Symphony release 1, 1.01, 1.1	N	256k	Same as above, except not EGA compatible (CGA only)
Inset 2 <i>APG Software</i>	\$99	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, Framework, PFS:Professional Plan, VP Planner	Y	125k	Text and graphics integrator; provides desktop publishing graphics features for spreadsheets; has graphics editor; can capture part or whole spreadsheet into a word processing document; can size 1-2-3 graphs and place them inside documents; supports EGA, CGA, Hercules, AT&T monochrome and DEB (Display Enhancement Board); supports all popular daisywheel, dot matrix, and laser printers
Schedule Grafix 2.0 <i>Digital Engineering</i>	\$235	Lotus 1-2-3 release 1A, 2.0; Symphony (versions 1.0 & up)	N	320k	Lotus 1-2-3-based scheduling program; generates presentation-quality schedules; supports all popular dot matrix and laser printers; supports EGA and Hercules graphics boards; generates plotter-to-printer and camera-to-monitor graphs; 512k is required for Symphony
MACROS					
101 Macros for Lotus 1-2-3 <i>Macropac International</i>	\$69.95	Lotus 1-2-3 (all versions)	N	256k	Adds word processing features to 1-2-3, including word-wrap; double-spaces 1-2-3 printouts or prints in elite type; creates graphic slide shows using 1-2-3; automatically addresses form letters and labels; adds menu-driven financial formulas and math functions; recalculates the range of a spreadsheet; includes a pop-up notepad, appointment calendar, and a calculator with scientific functions and memory
101 Macros for Symphony <i>Macropac International</i>	\$69.95	Symphony (all versions)	N	256k	Same as above, plus automatic building of custom-made forms; automatic bold and italic type, page breaks, and margins in sheet mode; provides insertion of subtotal lines and instant subtotal calculations; recalculation of spreadsheets by range; has Gantt-like project management scheduling
KeyMac <i>Fox & Geller</i>	\$49	Lotus 1-2-3 release 1A, 2.0	Y	256k	Allows users to create 1-2-3 keyboard macros by using the "learn mode" to capture keystrokes in a buffer; compresses 1-2-3's multikey instructions into single keystrokes

*If the program is RAM resident, "memory required" refers to the actual memory consumed by the software; for non-resident software, this figure refers to the minimum system RAM required to load the program.

PACKAGE/Company	PRICE	SPREADSHEET COMPATIBILITY	RAM - RESIDENT	MEMORY REQUIRED*	DESCRIPTION AND FEATURES
MACROS (Cont.)					
Menu System <i>Cottage Industries</i>	\$49.95	Lotus 1-2-3 (all versions), Symphony, SuperCalc 4, MultiPlan, PFS:Professional Plan	N	64k	Automates DOS commands; creates unlimited user-defined nested macros; prompts users for file names to be inserted into DOS commands; passes keystrokes through to the keyboard buffer; offers an unlimited number of user-definable submenus
Quickcode for 1-2-3 <i>Fox & Geller</i>	\$149	Lotus 1-2-3 release 2.0	Y	384k	Creates data entry forms for users of 1-2-3 data bases; Quickcode-generated data bases can also check entries for specific values or ranges of values; translates user-created macros into 1-2-3 format; stores keystroke commands in its macro buffer so you can replay the keystrokes from the buffer with the echo command; transfers macros between worksheets; features macro debugger
QuickMac <i>Fox & Geller</i>	\$129	Lotus 1-2-3 release 1A	Y	384k	Creates macros entirely within 1-2-3 environment; has 1-2-3-like menus; automatically formats programs and allows users to name them; incorporates a keyboard macro facility that allows users to store and retrieve repetitive or frequently used keystroke sequences; reduces the six or seven keystrokes for each 1-2-3 macro to a single keystroke; stores frequently used sequences in a library; lets users build a library of linkable subroutines
PRINTING					
SideStep <i>SoftCorp</i>	\$60	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, VP Planner, Framework, PFS:Professional Plan	N	128k	Rotates spreadsheets 90 degrees and prints wide spreadsheets on one continuous sheet of paper; has eighteen combinations of type size; offers unlimited spreadsheet width; supports hard disk path commands; operates from the DOS command line, supports most popular IBM, Epson, Okidata, and compatible printers; supports IBM graphics characters; prints with double-strike or emphasized print
Sideways <i>Funk Software</i>	\$69.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, VP Planner, Framework, PFS:Professional Plan	Y	20k/70k	Rotates spreadsheets 90 degrees; unlimited width; nine type sizes; bold, underline, and expanded features for 1-2-3 and Symphony; requires 70k for 1-2-3 and Symphony; memory requirement for all other spreadsheets is 20k
Twist and Shout <i>Spectre Technologies</i>	\$34.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, VP Planner, Framework, PFS:Professional Plan	N	128k	Sideways printing, bonner printing; offers unlimited spreadsheet width; three different typefaces that can be mixed, and letter height from two to eight inches; supports most popular dot matrix printers
TEXT EDITING					
4Word, The Add-In Word Processor <i>Turner Hall Publishing</i>	\$99.95	Lotus 1-2-3 release 2, 2.01	Y	48k	Attaches itself to 1-2-3; makes use of 1-2-3 commands to move and copy; gives users such word processing features as word wrap, block moves, and copy; contains print enhancements; integrates spreadsheet data into word processing documents
Note-It 2.0 <i>Turner Hall Publishing</i>	\$79.95	Lotus 1-2-3 release 1A, 2.0	Y	72k	Allows users to attach notes to different cells in a spreadsheet; searches through the notes for a specific string or word; highlights all cells containing notes with a single command; lists the cells that have notes attached to them and prints the notes in four different formats; can attach a note to a 1-2-3 file name; removes itself from memory as soon as the user exits 1-2-3
Ready <i>Living Videotext, Inc.</i>	\$99.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), Framework	Y	128k	Outline generator and file mover; documents spreadsheets; designs the left edge of the spreadsheet, then transfers it into any spreadsheet program; transfers outlines with a single keystroke; built-in outline processor; includes appointment calendar
SmartNotes <i>Personics Corp.</i>	\$79.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, VP Planner, Framework, PFS:Professional Plan	Y	90k	Allows users to attach notes to spreadsheet cells, rows, column headings, or file names; offers unlimited number of notes, and up to 50 notes per note file in memory at any time; offers reconfigurable default settings that allow for changes in size and color of notes; offers four colors: red, blue, purple, and green

*If the program is RAM resident, "memory required" refers to the actual memory consumed by the software; for non-resident software, this figure refers to the minimum system RAM required to load the program.

Peachtree Complete Accounting for Just \$199

Everyone's Asking How Can We Do It?

When you reduce the price of an 8-package accounting system from \$4,800 (or \$600 a module) to \$199 for the complete set, people are bound to ask questions. Here are some of the most popular ones we're hearing at Peachtree:

Q. How can we afford to sell Peachtree Complete at such a low price?

A. We've **reduced our costs without reducing product features**. Peachtree Complete has been **repackaged** into one set that includes more thorough and better organized user instructions.

We've also streamlined order processing and reduced overhead. It is **faster and easier to buy** our product.

Peachtree has long been the first name in accounting software, so we've had time to completely amortize our original development costs plus make over 100 major additions. These **enhancements** include multi-company capability, menu driven installation and removal of copy protection. Consequently, you're getting a proven product at a better price.

We also "unbundled" **support** (so **you only pay for what you need** when calling our toll-free technical support hotline) and established a network of local dealers to serve as Independent Peachtree Support Centers.

Q. What does Peachtree Complete include?

A. 1. Eight Integrated Software Modules:

- General Ledger
- Accounts Receivable
- Sales Invoicing
- Accounts Payable
- Inventory Control
- Fixed Assets
- Job Cost
- Payroll

2. Installation Guide to lead you step by step through our simple installation procedure.

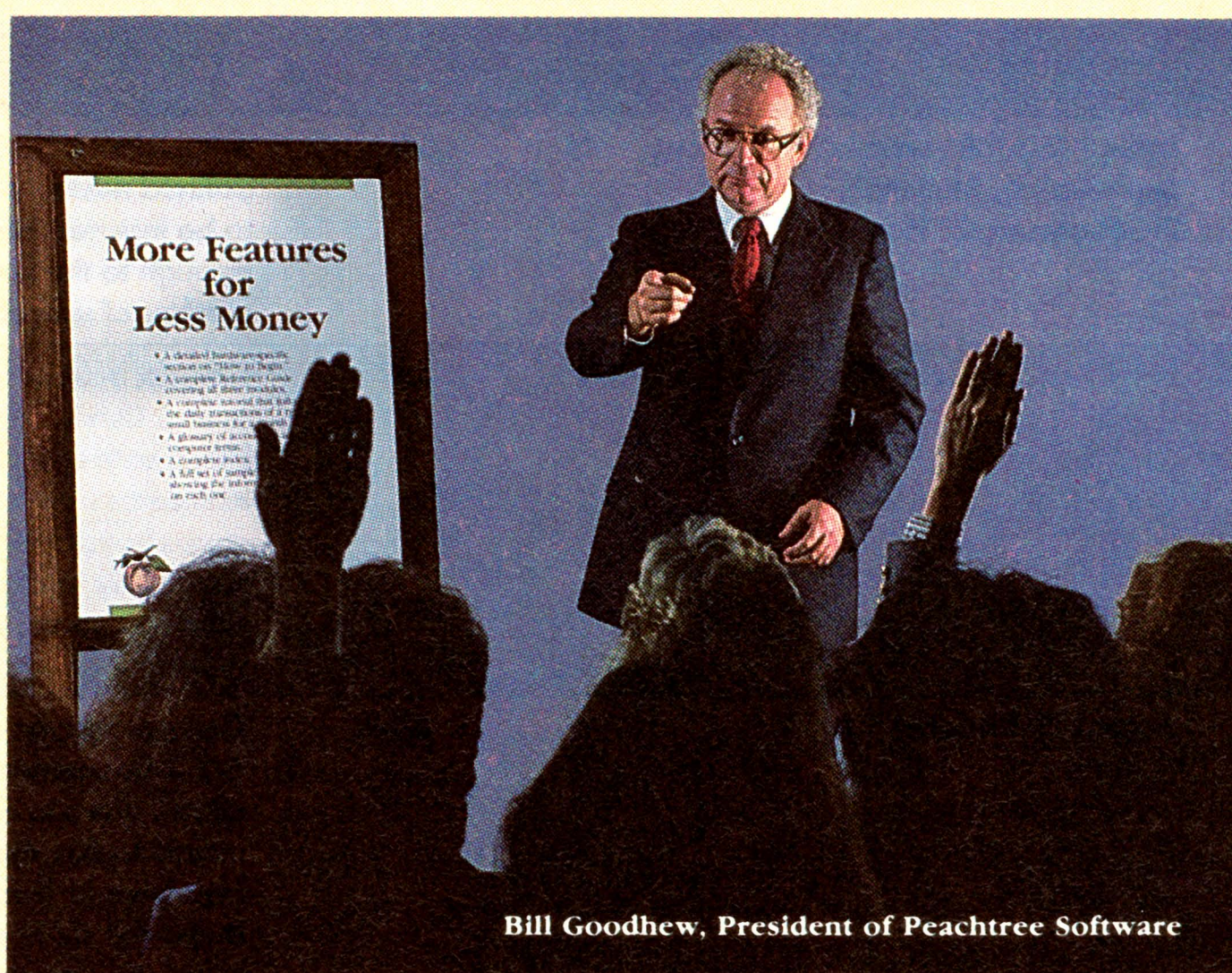
3. Accounting Primer, written for Peachtree users by an industry expert, to explain accounting concepts.

4. Tutorials on each module with sample data to make learning easier.

5. A complete Reference Library with detailed instructions in plain English on all software functions.

Q. Is Peachtree Complete really the same product that used to sell for \$600 per module?

A. Peachtree Complete is basically the same accounting system that both



Bill Goodhew, President of Peachtree Software

Peachtree and IBM sold for about \$5,000 but with substantial improvements in function and presentation.

Data files built with previous versions of the system are compatible, so many users are upgrading to Peachtree Complete to take advantage of the new features and benefits.

With more than 150,000 users to its credit, Peachtree Complete has been the **PC World Class Winner** in its category for two of the last three years.

Q. What's the difference between Peachtree Complete and the \$69.95 systems?

A. Peachtree's system is called Complete because it contains the eight most needed accounting packages (including payroll) and all reference materials for one price. Remember, it was **designed as a \$4,800 accounting software system**.

The \$69.95 systems, on the other hand, are incomplete. They were designed to sell for \$69.95 and require the purchase of additional modules to be comparable—payroll, \$49.95 more; tutorials, \$19.95 each; etc. Everything is a la carte.

Q. How soon will I outgrow the system?

A. Peachtree Complete handles revenues up to \$21,000,000, so only the largest companies will outgrow the system. The ability to **process data for at least 50 individual companies** is one of the system's biggest selling points.

The new optional **multi-user module** allows Peachtree Complete to be installed in a local Area Network, and **Peachtree Data Query**, for just \$199, lets you quickly transfer your accounting data to many popular spreadsheets

and databases, as well as produce custom reports.

Q. What if I'm not satisfied with Peachtree Complete?

A. When you purchase Peachtree Complete directly from Peachtree Software, you're protected with a **30-Day Money Back Guarantee** (an option even the most expensive accounting products don't offer).

If you're not satisfied, simply return the complete product in saleable condition within 30 days and your purchase price will be promptly refunded. For full details on our support plan and money-back guarantee, call the toll-free telephone number below.

PC Magazine Best of 1986

"Kudos to Peachtree, which woke up one morning and decided that its eight integrated accounting software modules, which the day before had sold for \$600 each, were at \$4,800 for the set, just a tad overpriced and so cut the price for the whole set down to \$199—a pretty good discount in anyone's league." —Jim Seymour, contributing editor of *PC Magazine*.

Compare Feature for Feature:

General Ledger

- Predefined and 25,000 user-defined Chart of Accounts
- Repeating journal entries
- Control report audit trail

Accounts Receivable/Invoicing

- Open item or balance forward customers
- Up to 12,000 customers
- Simultaneous updating of Inventory and A/R data files at time of invoice entry

Accounts Payable

- Selection of invoices for payment based on user-defined discount & due dates
- Up to 14,000 vendors
- Cash requirements forecasting by due date
- Checks printed with detailed stub listing invoices paid

Inventory

- Supports average, last purchase and standard costing methods
- Up to 21,000 inventory items

Fixed Assets

- 5 property and 8 asset classification categories
- 5 different methods of figuring depreciation

Job Cost

- Tracks costs and profitability on a job-by-job basis
- Compares estimated costs with actual costs for specific tasks

Payroll

- Built-in current year federal, state, city and county tax tables for all 50 states
- Automatic federal, state, city and county withholding calculations
- Supports hourly, salaried, commission or draw-against-commission pay types
- Processes up to 3,900 employees
- Updates published regularly by Peachtree Software

Requires MS-DOS version 2.0 or higher with 128K of RAM. For use with the IBM® PC, PC XT, PC AT and compatibles. IBM is a registered trademark of International Business Machines.



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Peachtree Software

4355 Shackleford Road, Dept. PER-03, Norcross, GA 30093

(For More Information Circle 13)

PACKAGE/Company	PRICE	SPREADSHEET COMPATIBILITY	RAM - RESIDENT	MEMORY REQUIRED*	DESCRIPTION AND FEATURES
TEXT EDITING (Cont.)					
Tornado Notes <i>Micro Logic Corp.</i>	\$49.95	Lotus 1-2-3 (all versions), Symphony (all versions), SuperCalc (all versions), MultiPlan, VP Planner, Framework, PFS:Professional Plan	Y	50k	Spreadsheet notepad that doesn't interfere with spreadsheet performance; users enter text into modules consisting of up to 500 windows; they can search for any set of related notes based on any word, phrase, or combination that appears anywhere in a note module; the adjustable windows can be browsed using an arrow key; does not attach notes to specific cells
MISCELLANEOUS					
Above Disk <i>Tele-Ware West</i>	\$99.95	Lotus 1-2-3 release 2.0, Symphony, SuperCalc 4	Y	68k	Allows added memory without an expanded memory board using hard disk to emulate up to eight megabytes of expanded memory
Passkey <i>Fox & Geller</i>	\$49	Lotus 1-2-3 release 1A	Y	256k	Provides comprehensive password protection for 1-2-3 files; guards worksheets by assigning passwords and encrypting data; users call the program up with 1-2-3's commands, set the password for a specific worksheet, then return to 1-2-3
Rescue 1.1 <i>Spectrum Computer Consulting</i>	\$49.95	Lotus 1-2-3 (all versions), Symphony (all versions)	N	128k	Retrieves lost spreadsheets; recovers corrupted 1-2-3 and Symphony files; program retrieves only the useful information and creates a healthy worksheet; features pop-up screens
S.O.S. 1.2 <i>Goldata Computer Services, Inc.</i>	\$49.95	Lotus 1-2-3 release 1A, 2.0; Symphony; SuperCalc; Framework	Y	10k	Helps ensure that spreadsheet data doesn't get lost; saves data in RAM to disk at user-defined intervals; warns when saves should take place; warns when the user does something that could destroy a spreadsheet; can be removed from memory with one keystroke; sets path for saving spreadsheets
SpreadLink <i>Saturn Business Systems</i>	\$150	Lotus 1-2-3 release 1A, 2.0; Symphony; MultiPlan	N	324k	Reformats data files or reports being moved into a spreadsheet, combining file transfer with reformatting
*If the program is RAM resident, "memory required" refers to the actual memory consumed by the software; for non-resident software, this figure refers to the minimum system RAM required to load the program.					

SPREADSHEET ADD-ON COMPANIES

APG Software; 12 Mill Plain Road, Danbury, CT 06811; (203) 794-0396 (For more information, circle 271)

The Binary Workshop; 44 East Main, Suite 202, Champaign, IL, 61820; (217) 359-3400 (For more information, circle 272)

Bridge Software; PO Box 118, New Town Branch, Boston, MA 02258; (617) 527-1585 (For more information, circle 273)

Brown Bag Software; 2105 South Bascom Ave., Campbell, CA 95008; (408) 559-4545 (For more information, circle 274)

Cambridge Software; University Place, Suite 200, Cambridge, MA 02138; (617) 576-5744 (For more information, circle 275)

Clarity Software Corp.; 13276 Research Blvd., Suite 206, Austin, TX 78750; (512) 331-5356 (For more information, circle 276)

Computer Associates International, Inc.; 2195 Fortune Drive, San Jose, CA 95131; (408) 942-1727 (For more information, circle 277)

Coral Software; PO Box 18543, Seattle, WA 98118; (206) 722-8410 (For more information, circle 278)

Cottage Industries; 2024 Swift, Suite 211, North Kansas City, MO 64116; (816) 221-8088 (For more information, circle 279)

Digital Engineering; PO Box 6076, Glendale, AZ 85312-6076; (602) 439-3245 (For more information, circle 280)

Enfin Software Corp.; 6920 Miramar Road, Suite 106-A, San Diego, CA 92121; (619) 549-6606 (For more information, circle 281)

Fox & Geller; 604 Market St., Elmwood Park, NJ 07407; (201) 794-8883 (For more information, circle 282)

Funk Software; 222 Third St., Cambridge, MA 02142; (617) 497-6339 (For more information, circle 283)

General Optimization, Inc.; 2251 North Geneva Terrace, Chicago, IL 60614; (312) 248-7300 or (800) 441-BEST (For more information, circle 284)

Goldata Computer Services, Inc.; 2 Bryn Mawr Ave., Bryn Mawr, PA 19010; (800) 432-3267 (For more information, circle 285)

Intex Solutions, Inc.; 568 Washington St., Wellesley, MA 02181; (617) 431-1063 (For more information, circle 286)

Living Videotext, Inc.; 2432 Charleston Road, Mountain View, CA 94043; (415) 964-6300 (For more information, circle 287)

Lotus Development Corp.; 55 Cambridge Pkwy., Cambridge, MA 02142; (617) 577-8500 (For more information, circle 288)

Macropac International; 19855 Stevens Creek Blvd., Suite 168, Cupertino, CA 95014; (408) 996-8143 (For more information, circle 289)

Micro Logic Corp.; PO Box 174, 100 2nd St., Hackensack, NJ 07602; (201) 342-6518 (For more information, circle 290)

North Edge Software Corp.; 239 Western Ave., Route 22, PO Box 286, Hamilton, MA 01929; (617) 468-7358 or (800) 225-5669 (For more information, circle 291)

Personics Corp.; 2352 Main St., Building #2, Concord, MA 01742; (617) 897-1575 or (800) 445-3311 or in Mass. (800) 447-1196 (For more information, circle 292)

Saturn Business Systems; 420 Lexington Ave., New York, NY 10017; (212) 557-8134 (For more information, circle 293)

SoftCorp; 2340 State Road 580, Clearwater, FL 33575; (813) 799-3984 (For more information, circle 294)

SoftLogic Solutions; 530 Chestnut St., Manchester, NH 03101; (800) 272-9900 or in N.H. (603) 627-9900 (For more information, circle 295)

Solar Systems Software; 8105 Shelter Creek Lane, San Bruno, CA 94066; (415) 952-2375 (For more information, circle 296)

Spectre Technologies, Inc.; 22458 Ventura Blvd., Suite E, Woodland Hills, CA 91364; (818) 716-1655 (For more information, circle 297)

Spectrum Computer Consulting; 9 Burditt Road, North Reading, MA 01864; (617) 664-0337 (For more information, circle 298)

Tele-Ware West; 18023 Sky Park Circle, Suite E2, Irvine, CA 92714; (714) 250-3320 (For more information, circle 299)

Turner Hall Publishing; 10201 Torre Ave., Cupertino, CA 95014; (408) 253-9607 (For more information, circle 300)

Vericomp; 8825 Aero Drive, Suite 210, San Diego, CA 92123; (619) 277-0400 (For more information, circle 301)
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Turbo Basic, (ADV) Cover 1, Circle 39
Turbo C, (ADV) Page 1, Circle 42
Turbo Pascal, (ADV) Cover 2, Circle 40

(Continued on page 195)

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22	52	82	112	142	172	202	232	262	292	322	352	382	412	442	472	502
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28	58	88	118	148	178	208	238	268	298	328	358	388	418	448	478	508
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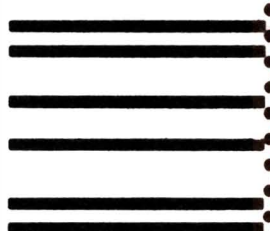
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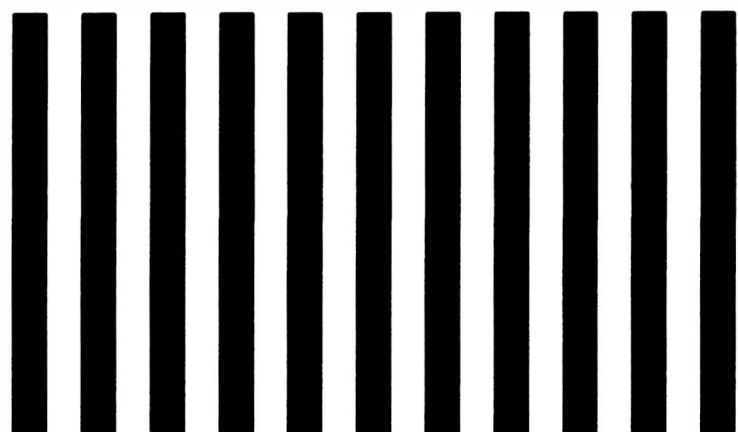
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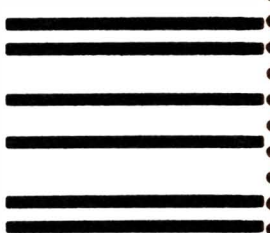
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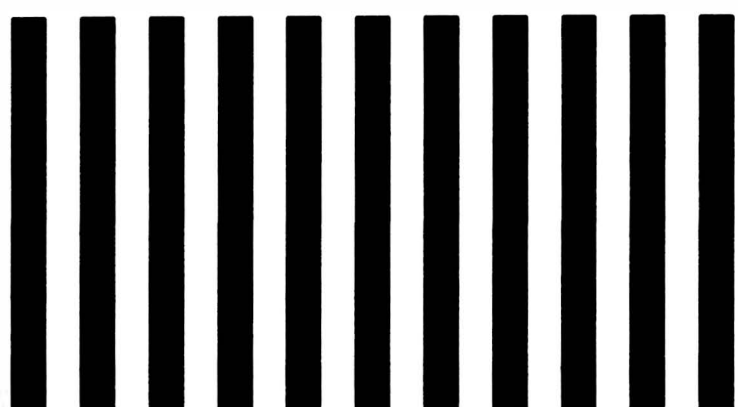
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A Better Way To Control That Laser

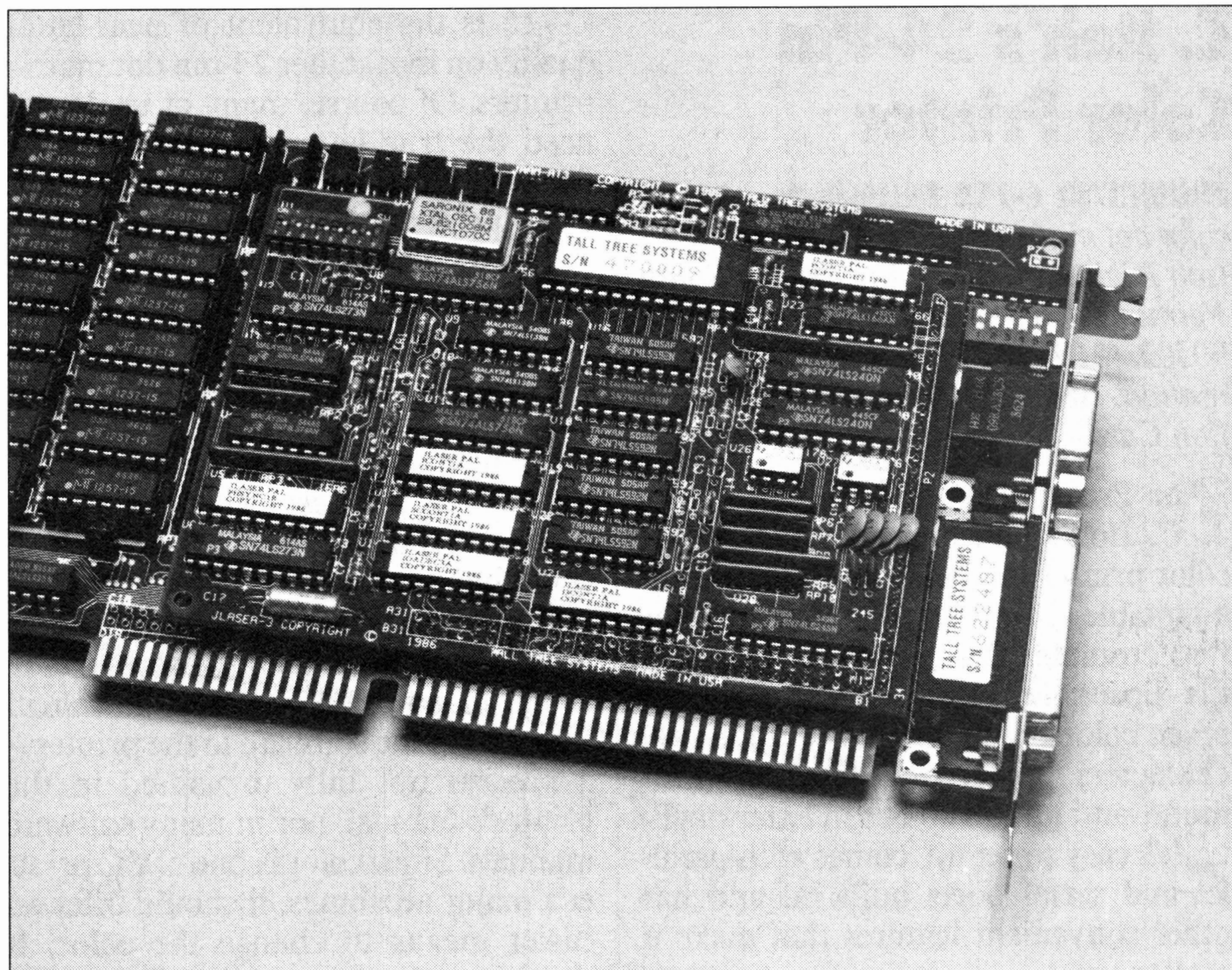
JLASER PLUS-AT is a board that fits into an IBM PC AT-compatible computer; it comes with cables and software; \$699 without memory; \$1,059 with 2Mb, retail; Tall Tree Systems, 2585 East Bayshore Road, Palo Alto, CA 94303; (415) 493-1980. (For more information, circle 260 on the Free Information Card.)

With users of Canon-engine-based laser printers making up the largest installed base of laser printer owners, a healthy upgrade board market has developed to bring their systems up to what has become the acceptable minimum standard for a complete page of graphics—300 dots per inch. As more people start using desktop publishing programs, output of anything less seems much too dotty and jagged to make the grade. And many laser printers slow down agonizingly when doing graphics.

Owners of such Canon-based printers as the Hewlett-Packard LaserJet, LaserJet+, and QMS Kiss who are tired of waiting four minutes or more for a half page graph to lumber out of their lasers, and who resent having to print small to get a dark, solid image, may consider the JLasar a serious alternative to a new laser printer.

The JLasar, a board that holds up to 2Mb of memory, goes into an open slot of an IBM PC AT or compatible computer and connects via cable to a laser printer. While installation in the computer is as easy as that of any board, it will require at least an hour to set up your laser printer properly. You'll also have to add some lines to your system's CONFIG.SYS file. The manual explains how to do this, but if you're still confused, Tall Tree's technical support people can talk you through both the software and hardware installation procedures. They were patient and helpful. The customer pays for the call.

You'll have to lift the lid off the laser, exposing the controller board, and plug a Y-splitter cable provided by Tall Tree into it. This will allow you to run the printer from the JLasar board in your computer, or from the laser's own controller. If you use the laser controller, you can continue to use the laser as you had been through your serial or parallel printer port. You'll still have to go this route when using software that doesn't offer a driver from its printer installation menu for the JLasar.



The JLasar board cables to a laser printer and adds up to 2Mb of RAM in the computer.

The JLasar does not support PostScript, the page description language built into two other Canon-based lasers, the Apple LaserWriter and QMS-PS 800. You'll have to print out the old way to access PostScript's fonts or produce special graphic effects only possible with PostScript. However, you may be pleased with the faster results you achieve by bypassing PostScript.

Programs that support the JLasar include Ventura Publisher, PagePerfect, PageBuilder, ChartMaster, TypeReader, Fancy Fonts, Printrix, Fontrix, LePrint, PC TeX and Hewlett-Packard's Soft Fonts. PC PaintBrush and Halo DPE are two programs that push the JLasar board to its limits, producing resolutions of 600 by 300 dpi. Beyond the better resolution (the LaserJet+ without an upgrade produces only 150 dpi when printing a full page of graphics), there is a noticeable increase in speed with the JLasar. Tall Tree claims pages will be printed up to 50 times faster than before.

There are some other benefits to the JLasar board. Before we installed it, we had 640k in our computer. Upon installation, we found our Lotus 1-2-3 release 2 status screen showing 2Mb of expanded memory available. The board's direct connection to our laser, which had been previously hooked to the computer's serial port, helped free up that very congested port, which at various times also drives an external modem and a mouse. The JLasar board also in-

cludes a port for a scanner, and we were able to plug in a Canon scanner and laser without sacrificing more than one slot in our IBM AT computer.

With this setup, we were able to use the JLasar software to make quick copies from the C> prompt. Typing in "JInput" triggered the scanner to pull through a document; moments later, an acceptable copy popped out of the laser. (You'll also need software like PC PaintBrush to save a scanned image to disk for later use.) Print spooling software is also included.

Tall Tree offers a variation of the JLasar board for owners of IBM PC- and XT-compatibles. With 0k, this version sells for \$599; with 2Mb, \$959.

Owners of Ricoh lasers, meanwhile, can buy a PC- and XT-version with 0k for \$818 and the AT version for \$898. Add \$360 for the 2Mb version in either case. The boards, which work with any printer built on the Ricoh 4080E laser engine, take up a slot and a half.

For the person who bought a laser printer as a silent daisywheel alternative, there is little reason to upgrade. He or she can print text and support all the font cartridges Hewlett-Packard makes, for example, without spending more money on hardware. However, for people who take pride in the quality of their graphics output, and want to significantly increase the speed at which pages are printed, the JLasar offers a real boost to productivity.

—Michael Antonoff

PRODUCT REVIEWS

C. Itoh's 24-Pin Color Printer

PROWRITER C-715 RELIANT is a 24-pin color dot matrix printer; \$1,295 retail. C. Itoh Digital Products, Inc., 19750 South Vermont Ave., Suite 220, Torrance, CA 90502, (213) 327-2110. (For more information, circle 251 on the Free Information Card.)

The ProWriter C-715 Reliant marks C. Itoh's entrance into the 24-pin color printer market. The Reliant is an adaptable 24-pin dot matrix printer that emulates four printers, including the Epson LQ 1000. It can print in seven colors, with a speed of up to 300 characters per second (cps) in draft mode, and up to 100 cps in letter quality. It's easy to set up, comes with parallel and serial ports built in, and has other convenient features that make it easy to use.

The C-715 has a 16-character LCD display panel that enables you to change the characters per inch, or cpi (10, 12, 15, or 16.7—compressed type) from the basic menu. From this menu, you can also change the page length and lines per inch. Through the push-button menu, you can select features like italics and color, and a myriad of other functions. The display panel is a nice alternative to the cumbersome dip switches found on many printers.

Letter quality and quiet mode can be selected from the front panel by pressing one button. If you're used to true letter quality, you may find that the C-715 falls a little short. Letter quality on the

C-715 is the equivalent of near-letter quality on most other 24-pin dot matrix printers. Of course, many of us do not need the true letter quality found on daisywheel printers. The quiet mode is a tad quieter than the regular mode.

The C-715 has a four-color ribbon—three more colors are produced through combinations of these. The ribbon life for color is 1.5 million characters, for black it's 7 million.

Unfortunately, the selection process for color is not easy. Through the extended menu, you can select black or color; but, once you select color, there is no option to select *what* color. This is handled through the software you're using. To get color, you must download codes from the software to the printer—a process not fully explained in the printer's manual, nor in many software manuals. Since color is one of the printer's major attributes, it should offer an easier means to change the color. It should not be the responsibility of the software when a simple solution like building in an extended color selection menu on the printer's front panel would correct the problem.

The tractor feed is a convenient feature. It allows you to load the paper from the top, bottom, or back, and has a push/pull feature that comes in handy for printing multipart forms and labels. This is one of the advantages the C-715 has over the Epson 1000 it emulates—the Epson 1000's tractor feed is not a standard feature. The C-715 printer's auto sheet feeder is optional—available at a cost of \$299 for the single bin, and \$468 for the double bin. You can also use standard or wide-size paper, up to

16 inches. Spreadsheet users, who also can choose condensed type, can pack a lot of data onto the page.

The C-715 can also emulate the Diablo 630, IBM's Proprinter XL, and Toshiba's P351 by means of an identity card. The identity cards are the size of a credit card and slide easily into a slot on the side of the printer. Emulation of the Epson LQ 1000 comes standard on the C-715. If you want emulation of one of the other printers, the cost is \$49.95 for the appropriate card. You can also get optional font cards for \$39.95 apiece. These enable you to print in Letter Gothic and Bold Proportional Space, among other fonts, and have the same easy installation as the identity cards.

You can generate high-resolution color graphics with the C-715, and the quality is excellent—solid graphs in a variety of vivid colors. To produce color graphics with 24-pin quality, you obviously must have a software program that supports your printer. The optional identity cards are a real advantage here. Since many graphics packages support one or more of the printers the C-715 emulates, you'll have support from a variety of programs.

An exceptional feature of the printer is that it comes with a 32k buffer. Typically the buffers on 24-pin printers are either 2k, 4k, 8k, or 16k. The Star Micronics NB-15, for example, offers a 16k buffer, while comparable printers such as Epson's LQ-2500 and Toshiba's P351 have 8k and 4k buffers respectively. With a 32k buffer, you can store a document of as much as 16 pages in the printer. Thus, if you're printing a long document, your computer isn't tied up while the information is being downloaded to the printer. With a 4k buffer, for example, you can only store two pages at a time. So if you have a 16-page document, your computer downloads two pages of information, and those two pages must be printed out before the buffer can accept more data.

The C-715's dimensions are as follows: The width is 24.9 inches; the depth is 14.7 inches; the height is 5.2 inches; and the weight is 37.5 lbs. The printer has a one-year warranty.

The C-715 has a lot to offer. Its near-letter quality, multicolor capability, and front-panel display are a nice combination of features in one unit. The C-715 is a versatile printer, ideal in an office environment in which a multifunction printer is a necessity.

—Heather-Jo Taferner



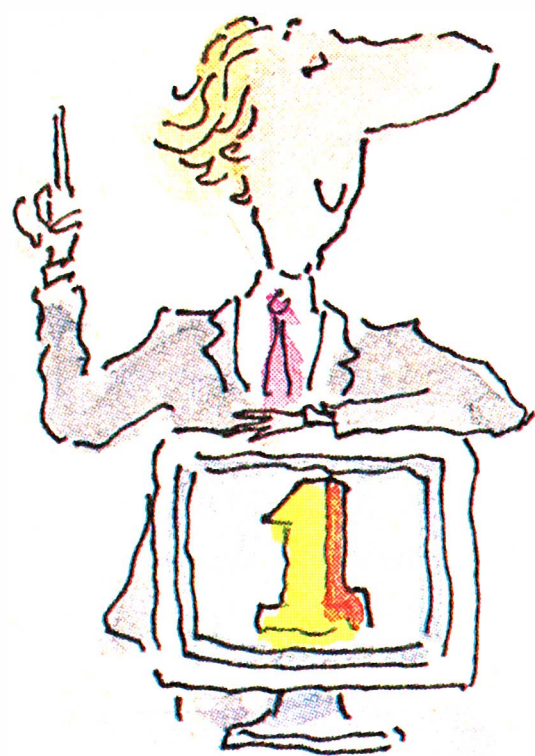
The Reliant uses credit card-size emulation and font cards, and prints in seven colors.

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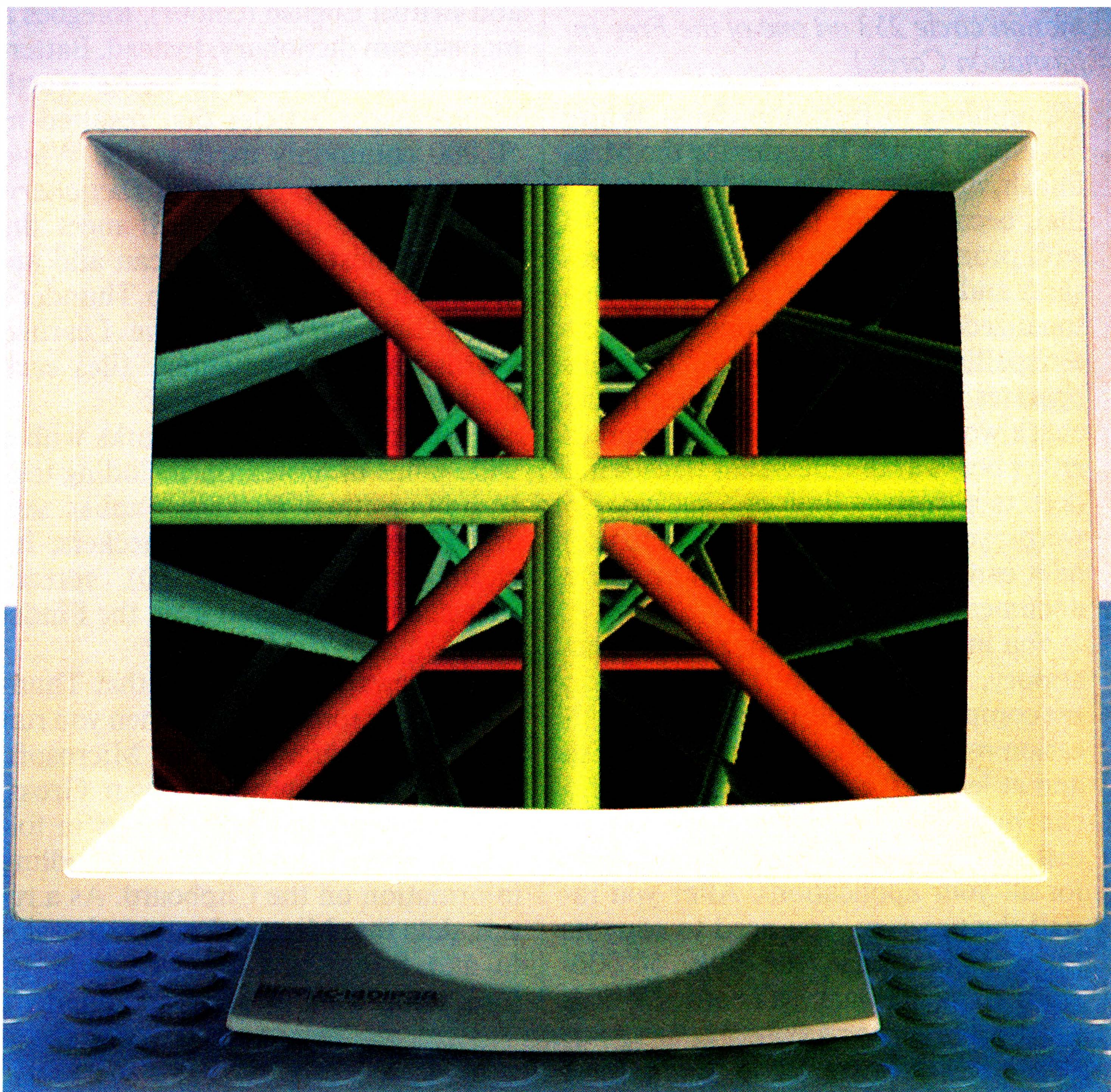


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Under A Spell

THUNDER, THE WRITER'S ASSISTANT, version 1.01, is a desk accessory-based spelling checker for the Apple Macintosh (minimum 512k of RAM required, not copy protected); \$49.95 retail or direct order; Batteries Included, 30 Mural St., Richmond Hill, Ontario, Canada L4B 1B5; (416) 881-9941. (For more information circle 253 on one of the Free Information Cards.)

Rumbling in from the Great White North comes Thunder for the Macintosh, an impressive spelling checker that, because of its flexibility (it works with programs other than word processors) and capacity for generating personalized dictionaries, is one of the better spelling checkers around. Thunder operates in either of two modes: It can check words interactively (the program either beeps or the menu bar flashes if it detects a misspelling as you type in words; you decide which marker to use) or it can check a single word or entire document you specify.

You install the program as a desk accessory, using the Font/DA Mover, on the computer's Apple menu. (The application requires 52k on the start-up disk and at least 150k of RAM to open and run properly.) If you're using a hard disk, you can have Thunder available for all your applications. After you install the program, you need to copy its three dictionaries (the 80k, 50,000-word main dictionary, a Learned Words

dictionary that expands user-defined abbreviations, and a user-expandable Supplementary dictionary) to either a start-up, data, or hard disk. You can put the dictionaries within a "folder" subdirectory or on the disk in the external drive—Thunder can access the dictionaries regardless of the location.

The program's list of main words, including those for both American (color) and British English (colour), foregoes a mainstream dictionary. Instead, Batteries Included utilized 10 weeks' worth of newspaper articles that resulted in 50,000 commonly used words. While it's not the *Oxford English Dictionary*, we think the program will meet the needs of most users. You can add approximately 2,000 words to Thunder's main dictionary, while the Learned Words and Supplementary files each hold up to 32,000 characters.

To its credit, Thunder works with a wide range of programs, including telecommunications packages (unlike several other Mac spelling checkers, including MacLightning 2.0), spreadsheets, data bases, and even the Finder itself.

Be forewarned, however, that Thunder displays some glitches when you run it using programs from Microsoft. Thunder's programmer, Evan Gross, says Microsoft has been remiss in following Apple's guidelines for handling information on the Clipboard. As a result, data that Microsoft cuts and pastes to and from the Clipboard loses its formatting. That means that Thunder's

spelling corrections will be inserted as plain text, minus fancy typesyles.

Microsoft programs can also be temperamental when it comes to dealing with desk accessories that add a pull-down menu to the menu bar (as Thunder does). The usual symptom here is garbage to the right of where the menu should be. If you attempt to pull down the menu, the program bombs and you have to reboot.

It's an especially ticklish situation with Thunder, since the program copies a document (or selection) to the Clipboard to check for errors, then pastes any changes back into the document. You can work around this irritation by postponing any formatting in Microsoft Word, for instance, until you've checked the document's spelling.

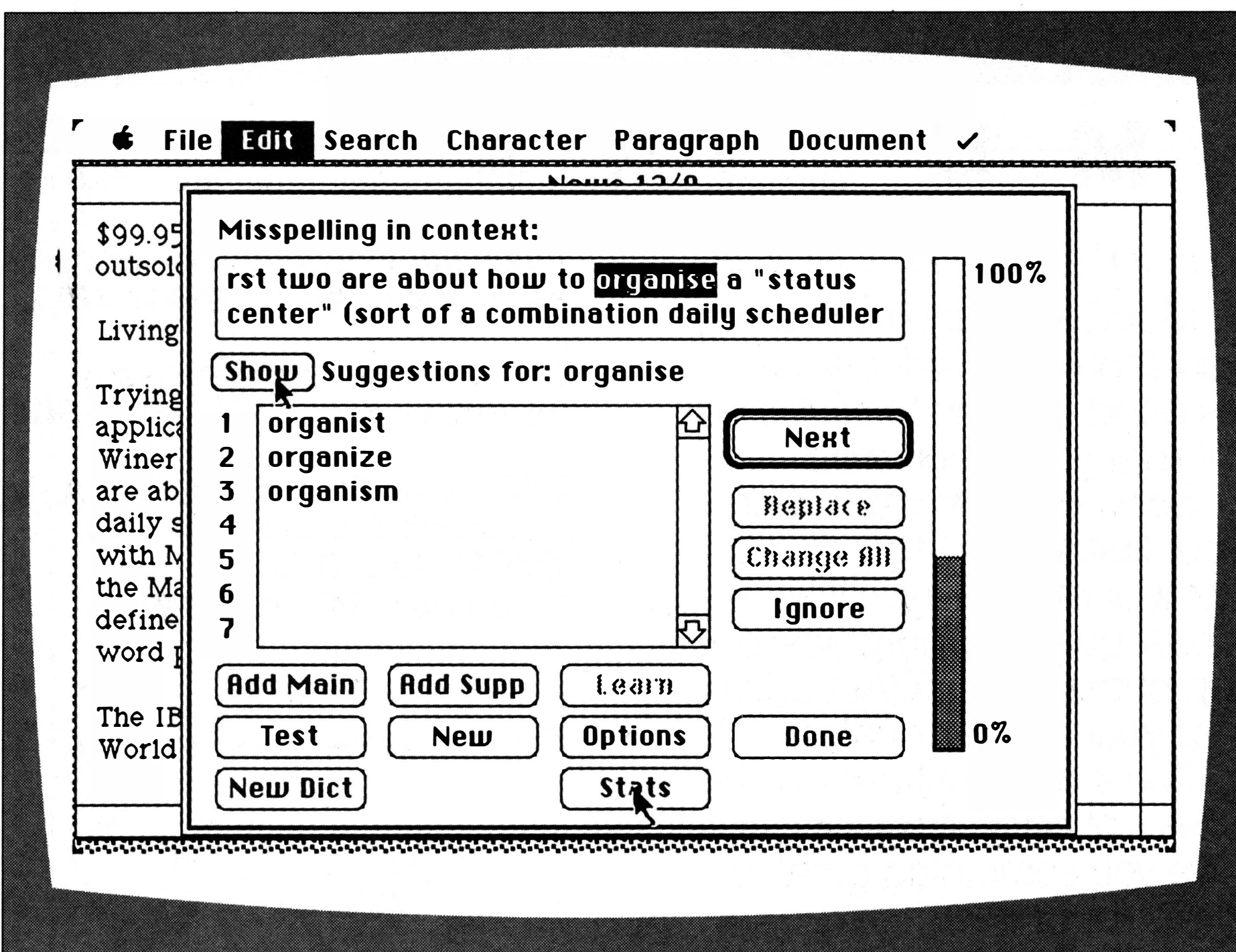
Perhaps the most impressive feature of the program is its ability to invoke nearly every Thunder command directly from the keyboard. This includes toggling interactive checking on and off (Command-/), checking a selection (Command-\), showing dictionary suggestions (Command-W), adding a word to the main dictionary (Command-M), and inserting a word from Thunder's numbered suggestion list (Command-#).

The Learned Words feature lets you "teach" Thunder words and also enter abbreviations that the program automatically expands into phrases of up to 255 characters. For example, you can call up the Learned Words dialog box and enter "vty" in the "learn that all occurrences of:" box and then "very truly yours" in the "should be replaced with" box. Then Thunder enters the phrase into your document every time you type "vty" followed by a space. This feature is similar to the glossary expander in Microsoft Word 1.05.

As an extra bonus, Thunder can provide a list of statistics about your document (number of characters, words, sentences, syllables, etc.) and also analyze the reading level of your work based on Gunning's Fog Index and Flesch's Index. Both will measure your document's readability to provide an idea of the academic level the writing represents.

Also note that Batteries Included uses a novel update policy—customers can download revisions to Thunder from the software aids and add-ons data library of the Macintosh user's section on CompuServe.

—Jack Bell



Thunder displays spelling errors in context and offers a list of suggested alternatives.

SYNC TWICE.

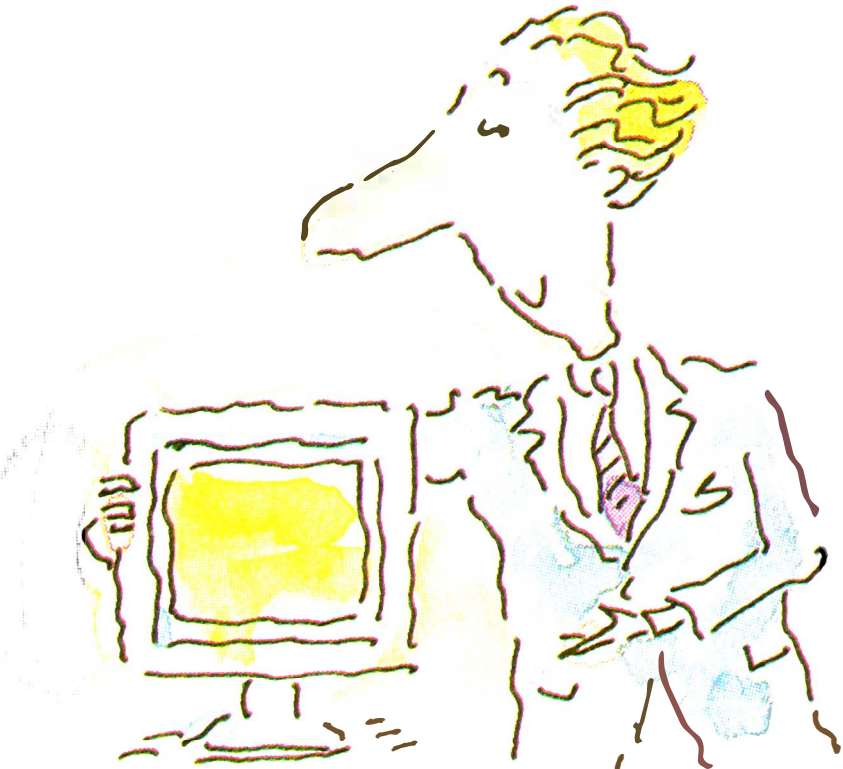
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PRODUCT REVIEWS

Printer Has Power And Speed

NISSHO NP-2410 is a letter quality dot matrix printer for the IBM PC family of personal computers. It comes with either a parallel or a serial interface; \$1,845 retail. Nissho Information Systems, 10855 Business Center Drive, Cypress, CA 90630; (714) 952-8700. (For more information, circle 261 on the Free Information Card.)

When users get together and talk about technology, the discussion usually focuses on the newest and fastest CPUs or the complex set of hoops that recently released software programs can jump through. If printers come up at all, they're usually cited in the same sentence as "horror story."

While many printers deserve such treatment because of confounding dip switches, unintelligible control codes, and bush-league output, a new era is dawning in the form of 24-pin dot matrix printers. The best now offer true letter quality output, multiple built-in fonts that don't require constant dip switching, and a reason to stop telling horror stories.

Nissho Information Systems' NP-2410 is one of these. At more than \$2,000 fully loaded, the printer isn't cheap. But then neither is the output. It is a letter quality printer with seven fonts, which can be selected by dialing a wheel on the front panel. At 150 characters per second (cps) in its letter quality mode and from 300 to 540 cps in draft

mode, the printer is so fast that people walking by your office are likely to poke their head in to ask what printer you're using.

It's not perfect, of course. No printer is. The rare times you have to get at the dip switches, you'll have to rummage around on the back side. If you don't follow paper-loading directions carefully, there's a paper jam every few pages when you're using the tractor feed (a \$195 option). The built-in buffer is only 6k, about one page. If you want a more realistic 48k buffer so your computer won't be tied up while you're printing a long document, it will cost another \$250. And unless you use the sound cover (which is standard), the NP-2410 can muffle a phone conversation.

The plusses outweigh the minuses, though, and users who need a heavy-duty dot matrix printer would do well to consider the Nissho. "Heavy-duty" means both weight, at more than 38 pounds, and claimed printhead life, at 200 million characters. The ribbon cartridges cost \$15 and are said to last for 5 million characters.

Its seven built-in fonts consist of four draft styles (10, 12, 15, or 18 characters per inch), letter quality courier, letter gothic, and also century proportional. Changing fonts is a simple matter of dialing the appropriate number on the wheel and pushing the reset button. Two more fonts (a cartridge of two fonts costs \$60), can also be chosen from the wheel. Other options include a single-bin sheet feeder for \$295 or a dual-bin that is priced at \$595.

IBM Graphics and Epson LQ-1500

emulation are standard, along with international character sets. When printing text, the characters are in matrixes of 18 by 24 (draft) or 24 by 36 (letter quality). When the machine is printing raster graphics, resolution ranges from 60 by 60 dots per inch to 180 by 360.

In addition to choosing print modes from the control panel on front, users are able to select a variety of other specs, including line spacing, bold or italic printing, and page length. The page-length choices are from 3 to 14 inches and every standard page length in between. Resetting the top of a form is also accomplished from the panel.

The NP-2410 has a 16-inch carriage (which means it doesn't fit easily on a desk), and its minimum width is 4.5 inches. Spreadsheet users especially will appreciate the wide carriage. With 18 characters per inch, you can print up to 238 columns. That's the setting that will produce 540 cps. A more standard 132-column spreadsheet printed at 10 cpi in draft mode moves along at 300 cps. For comparison, Epson's \$1,595 LQ-2500 has speeds of 90 cps in letter quality and 270 cps in draft mode.

It is intended to be used as a bidirectional printer but can be switched to print in one direction. In fact, it automatically switches over to unidirectional printing (at half the normal speed) if the built-in sensor detects a high temperature in the hardware. That means there's little chance that the printer will work itself into a frenzy and stop functioning from overheating.

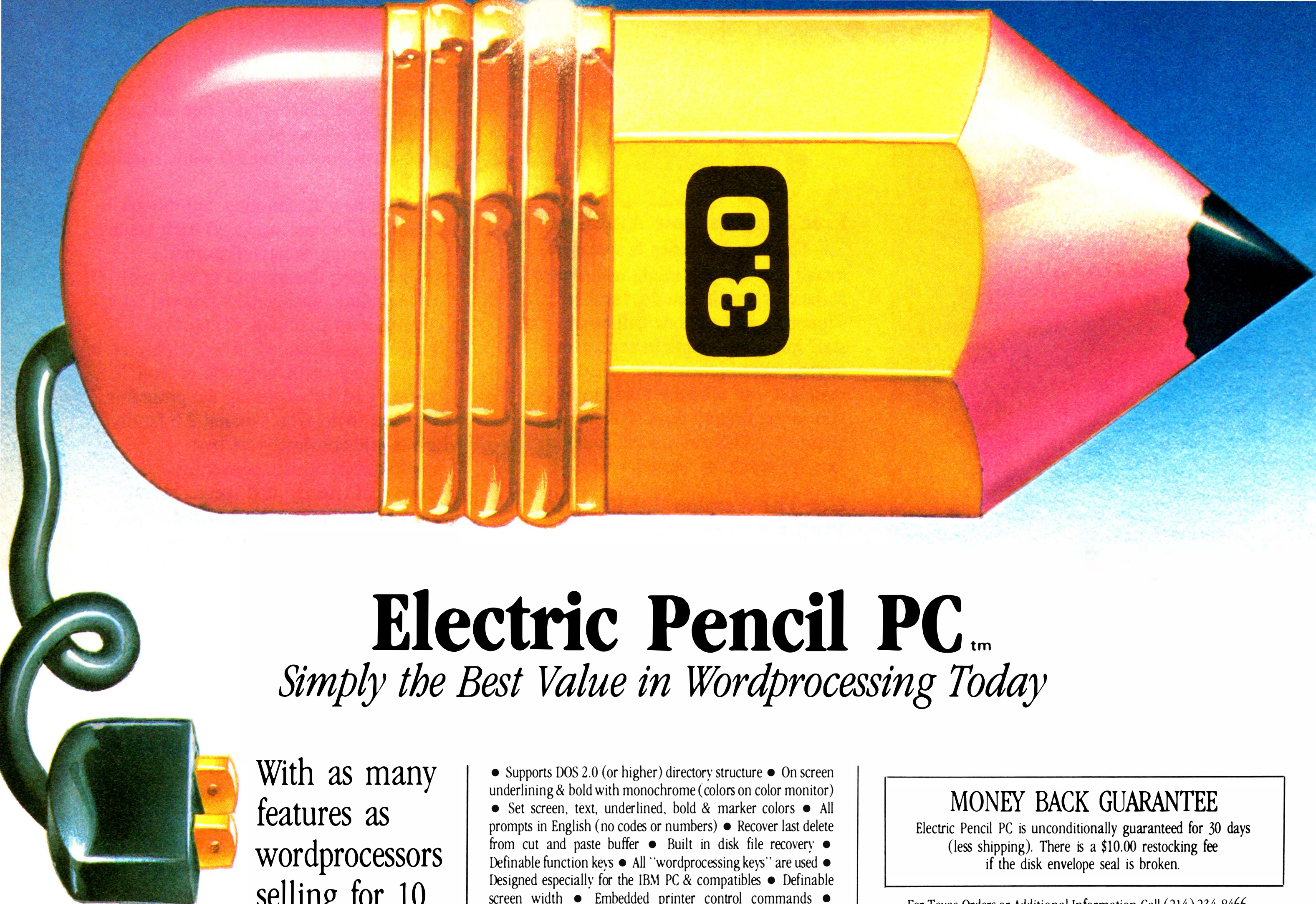
Another nice touch is that if the paper-out indicator comes on during operation, it's still possible to finish printing a document on the last page fed in because pressing the on-line switch prints one line at a time. Another convenience feature is that the form feed button on the front panel works without taking the printer off-line.

The NP-2410 is so user-foolproof that it would make a good departmental printer, especially with the larger print buffer. Its output compares favorably to that of other 24-pin printers, which many companies are choosing as alternatives to the higher capabilities and price of laser printers. The Nissho printer is fast enough to handle a series of long drafts quickly, and the quality is high enough to meet the needs of the most demanding business correspondence. Users who want speed and letter quality for text, graphics, or both, certainly should consider it.

—Sandra R. Reed



Controls of the Nissho NP-2410 letter quality dot matrix printer are on a panel in front.



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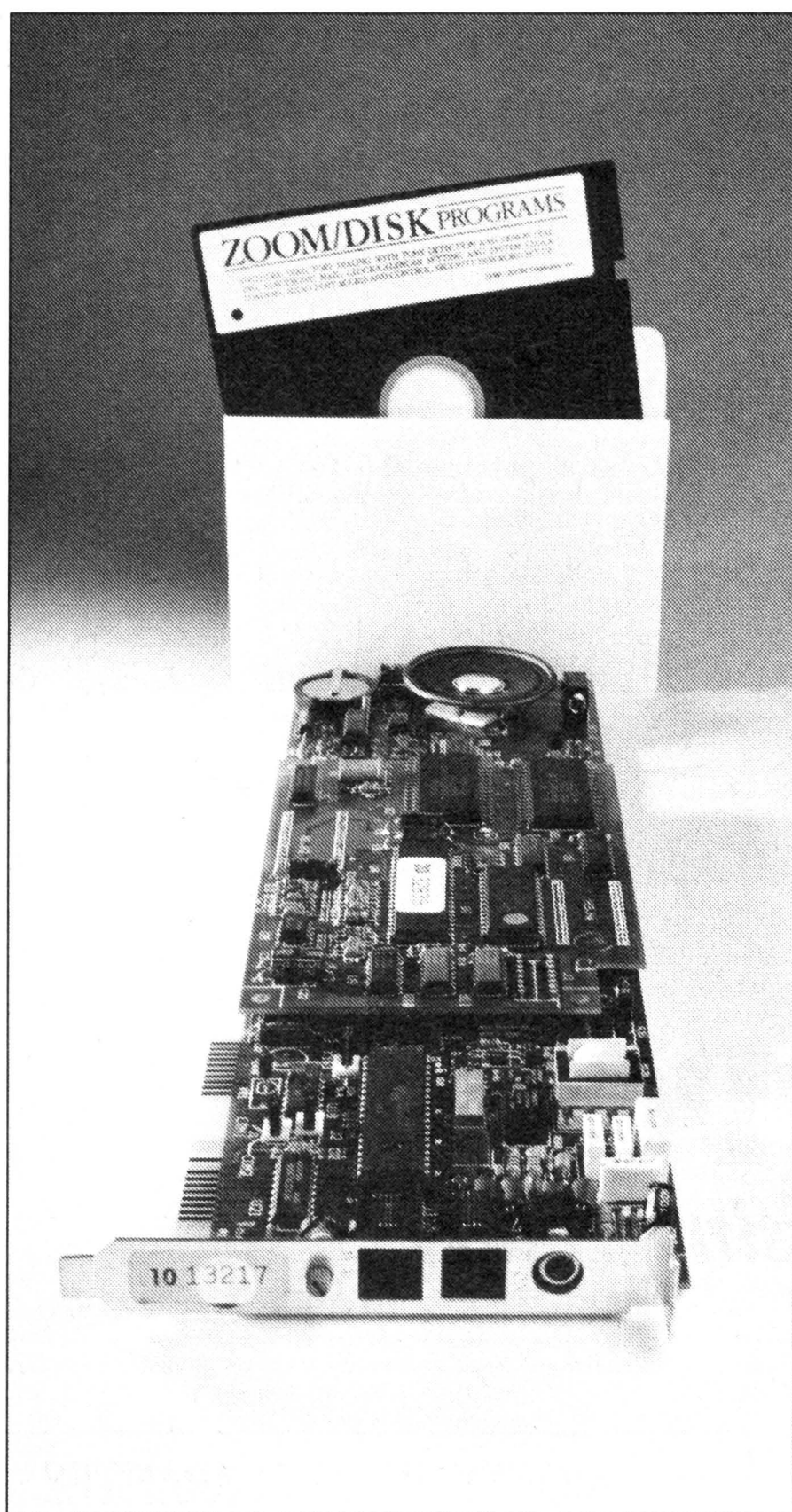
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The Zoom/Modem now costs \$349.

The Smooth Zoom/Modem

ZOOM/MODEM PC 2400 XL is a 300/1200/2400 bits-per-second internal, full-card, Hayes-compatible modem for the IBM Personal Computer, PC XT, PC AT, and compatibles; \$349 retail or direct order (Zoom/Disk software, version 1.5, included); Zoom Telephonics, 207 South St., Boston, MA 02111; (800) 631-3116. (For more information, circle 254 on the Free Information Card.)

Zoom. It may seem a trivial name, but there's nothing trite about this thoroughly impressive personal computer telecommunications package—the Zoom/Modem PC 2400 XL by Zoom Telephonics.

Modems from Zoom Telephonics are available in several different configurations. The PC 2400 XL reviewed here includes a clock/calendar with battery (a \$25 value), a 32k electronic mail buffer (\$50) that extends the command line to 255 characters, and a \$25 touch-tone decoder that provides a security feature and offers remote access from a touch-tone phone if your modem is set to answer a call. There's also a \$29 option that extends the product's two-year war-

ranty to five years. Also bear in mind that Zoom Telephonics has cut the prices of its complete modem product line as of February.

The Zoom/Modem is 100 percent Hayes compatible (which means support for the Hayes "AT" command set and other features), delivering capabilities that other manufacturers merely lay a claim to. The Zoom/Modem also supports the Bell 103, Bell 212A and CCIT high-speed data transmission formats. We ran a number of communications packages (Relay Gold, HyperAccess, Smartcom II, and Get) that all had been configured to operate with a Hayes Smartmodem 1200B. All of the programs operated without a single revision to their software configurations other than stepping transmission speed up to 2400 bits per second.

The Hayes 2400B retails for \$739 (\$799 including Smartcom II software), yet lacks many of the cheaper PC 2400 XL's powerful features. These include Demon Dialing of engaged and unanswered numbers; an audio input/output interface that enables the user to connect an external speaker and also receive audio signals (touch-tones); and access to the COM3 and COM4 serial port addresses.

The first step in the installation procedure is running the Zoom/Disk program without the Zoom modem installed inside your computer. This software is not a communications program, but enables you to set the modem to your requirements. The Zsetup file will check to see which COM port (1 or 2) is available. The program found that COM2 in the NCR PC8 used for this evaluation was available. Adjusting the modem for that port meant changing two jumpers on the modem's circuit board, both clearly marked in the manual. You must also flip a dip switch if you want your modem to auto-answer incoming calls. The other program files enable you to call a variety of on-line services such as CompuServe or another computer (Zdial), set the modem's clock/calendar (Zclock), operate the incoming message buffer (Zbuffer), and send commands directly to the modem (Zcommand).

Demon Dialing, the ability to make the modem dial a number continually until a connection is attained, was invented by Zoom Telephonics in 1981. Through the use of tone-detect characters (to instruct the modem to listen for a specific tone) and action characters (to specify action the modem should

take) the Zoom/Modem will Demon Dial any number that you specify, along with the necessary modem commands, on the command line.

It works like this: When so instructed, the modem dials a number 10 times in rapid succession. If unsuccessful, the modem then dials the number five more times during a 10-minute span. The entire process is repeated again after a 10-minute wait if there is still no contact after the 15th call. The Zoom/Modem's Demon Dialing will repeat the suspended 15-call sequence until either the phone call is completed or a 10-hour limit is reached.

There are two basic ways to invoke Demon Dialing from the command line. The first involves the use of the "J" and "{" characters. Entering "J" after the tone-detect character "W" causes the modem to jump back to the beginning of the command line if the modem does not complete the call. Likewise, entering "{" after the tone-detect character will cause the modem to hang up, pause, then jump to the next number in a list to be dialed.

The second method requires entry of the "A=" command (instead of the Hayes AT command), which instructs the Zoom/Modem to Demon Dial the last number the modem has dialed until a carrier signal is detected.

Where the 120-page Zoom/Modem manual is concerned, first impressions aren't lasting impressions. A quick flip-through revealed amateurish drawings and pages upon pages of command codes and other technical material. Don't be put off. This spiral-bound book is a literate, even chatty, presentation of one of the most mystifying aspects of computing today: telecommunications.

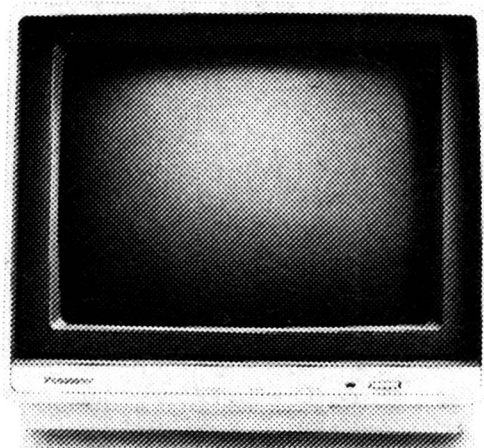
The Zoom manual is broken into three parts—the Owner's Manual, Programmer's Guide, and Appendices—and adeptly knifes through the dense fog often associated with installing a modem and getting it to operate. If there's a gripe here, it's the failure to place the Zoom Telephonics' address and phone number in an easily accessible place. The information is there, to be sure, but why is it necessary to ferret out the phone number on page 23 (in the section dealing with technical support) and the address on page 98 (in a section aimed at developers)? Come on now, this is a product the company can be proud of. There's no reason to hide.

—Jack Bell

HOW TO PUT IT ALL TOGETHER WITHOUT GOING TO PIECES.



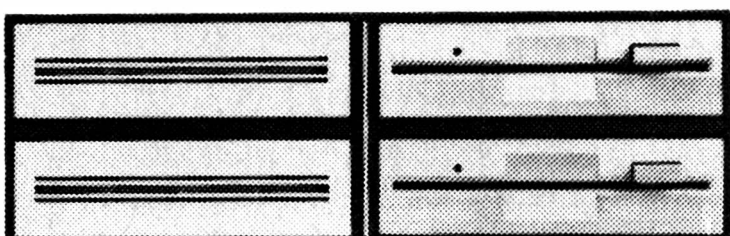
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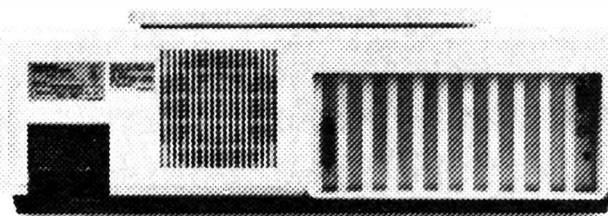
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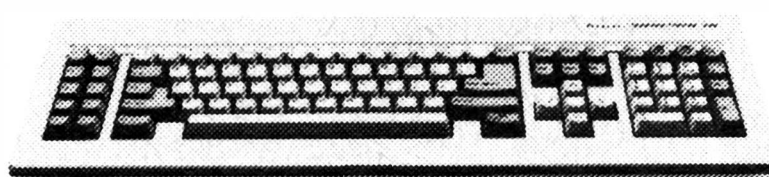
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PRODUCT REVIEWS

Word Processing File Conversion

WORD FOR WORD version 1.19 is a file conversion program for word processors. It runs on the IBM PC, PC XT, PC AT, and compatibles with 256k and DOS 2.0 or higher; \$149 direct order, volume purchase discounts and site-licensing agreements available; non-copy protected; Mastersoft, Inc., 909 Electric Ave., Suite 202, Seal Beach, CA 90740; (213) 493-2471, (800) 654-5301. (For more information, circle 259 on the Free Information Card.)

An essential component of personal computing has always been freedom of choice. Word for Word enables word processing users in a business environment to work with different programs without sacrificing the ability to exchange the files. This utility program supports two-way exchange between WordStar 3.30 and 3.31, WordPerfect 4.1, MultiMate 3.3, PFS:Write version C, IBM Writing Assistant version 1.0, Volkswriter 3, 1.0, Volkswriter Deluxe 2.2, ASCII, and EBCDIC files.

Users with hard disks can install every single available conversion option, or only some, as they wish. With floppy-based systems, a maximum of three modules at a time can be installed. Storage capacity is a factor, because Word for Word's conversion is a two-step process. The word processing file is converted into an intermediate file, and

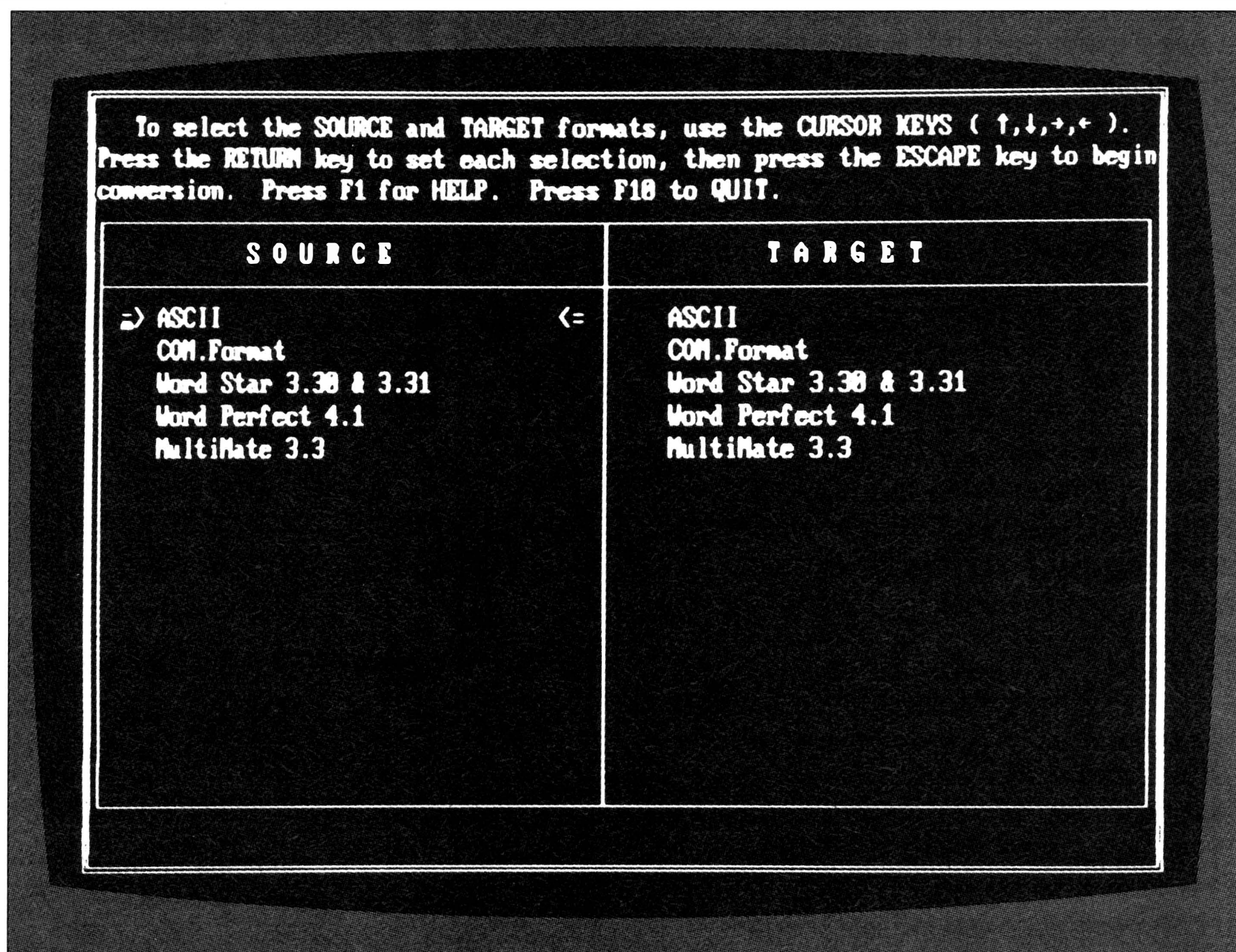
then reconverted into the new word processing file. Word for Word performs its conversions speedily and is easy to understand and use.

Word for Word does a good, though not perfect, job of converting files from word processor to word processor. In our tests, the program scored well at maintaining print enhancements and formatting. In moving from WordStar to WordPerfect, for example, it successfully handled such features as boldfacing, underlining, centering, margin settings, and justification, while being unable to convert super- and subscript and double-strike commands. Users will need to do some cleaning up of non-converted features such as these, but we found this to be minimal, particularly when compared to what the program can successfully handle.

Among Word for Word's file conversion options is COM.FORMAT. When you convert one word processing file to COM.FORMAT, you can then transmit it by modem without having the formatting stripped out. It can then be reconverted to the original word processor file, or any of the others that Word for Word works with.

At over \$100, Word for Word is a luxury for anyone who only infrequently needs to swap documents with someone using a different word processor. But in a setting where conversion requirements are extensive, it can deliver consistent value. And in so doing, it helps keep personal computing personal.

—Bob Sillery



Word for Word: a utility program that converts files between different word processors.

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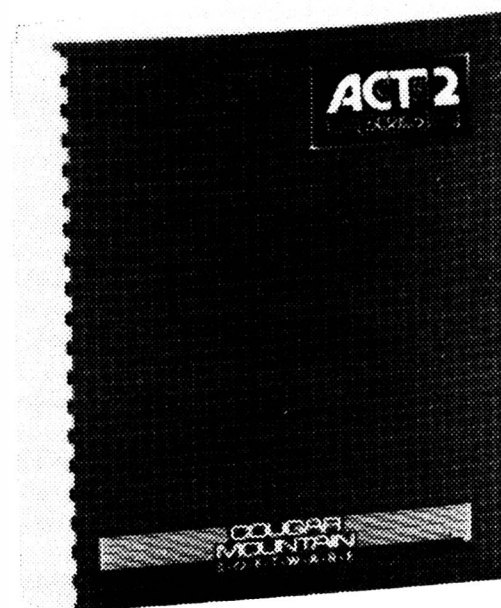
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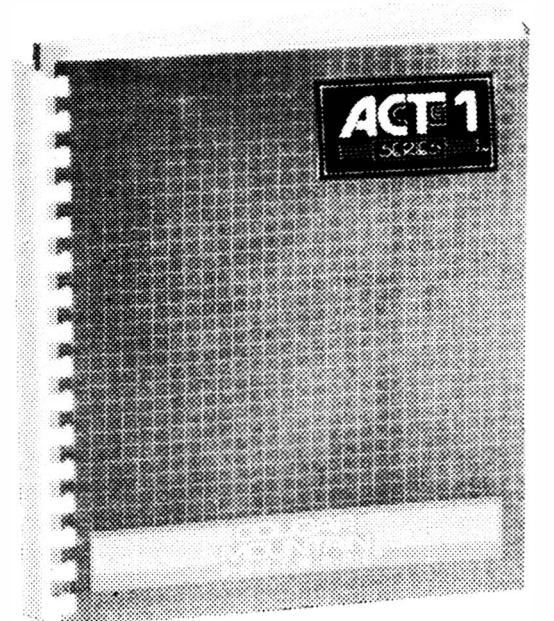
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PRODUCT REVIEWS

Scanning Images Into Your Computer

MICROTEK MS-300A connects to the Apple Macintosh with at least 512k; external drive or hard disk recommended; \$2,495 retail or direct order (includes scanning software and interface cable); Microtek Lab, Inc., 16901 South Western Ave., Gardena, CA 90247; (213) 321-2121. (Circle 258 on one of the Free Information Cards.)

The explosion in desktop publishing during the past year has sent hardware manufacturers dashing to release products that can fully exploit personal computing's latest cash cow.

Near the top of the desktop publishing pyramid rests Microtek Lab, Inc. (a division of Microtek International of Taiwan), maker of the MS-300A image scanner. In addition to marketing the product for Apple's Macintosh Plus (and other systems), the company is the original equipment manufacturer (OEM) of scanners sold by Abaton, AST, Gestetner, Packard Bell, and A.B. Dick. These value-added resellers, however, often sell the scanner with their own software programs added. For instance, Abaton opted to write its own scanning application (C-Scan), while AST stuck with Microtek's program.

In essence, an image scanner enables

the user of a Mac Plus and LaserWriter printer to feed graphics (photographs and other artwork), one by one through the scanner, which digitizes the information. The user is then able to save the image to disk. The graphic then can be transferred to a page makeup program, such as Aldus' PageMaker for example, where it can be resized or cropped, inserted in a newsletter or business report, and printed with the LaserWriter.

The 19-pound MS-300A desktop scanner, which is capable of scanning images at 300 by 300 dots per inch, measures nearly 15 inches wide, 5 inches high, and 18 inches deep. Single-sheet documents (a maximum 8.5 by 14 inches) can be fed through the scanner's roller or else users can purchase an optional multisheet (maximum 50 pages) auto-feeder (\$295). The unit scans an 8.5- by 11-inch document in about 10 seconds. The scanner attaches to the Mac Plus through one of the computer's two 9-pin serial ports with an interface cable that is included with the unit.

The hardware unit is truly the foundation from which the VersaScan software (not copy protected) erects the elements of the scanned image. Version 2.07 was used for this review running on Apple Computer's Hard Disk-20SC. When scanning and then saving an image, consider that your storage area, even on a high-capacity hard disk, could be quickly exhausted. For instance, a

small snapshot occupied 130k, so it's definitely a good idea to archive your saved scans to floppy disks. Also, when transferring scanned images into a PageMaker document and then printing, it's necessary to make sure that PageMaker has access to the original scanned image.

That said, the VersaScan software offers impressive flexibility, including the scanning of both line art (black-and-white documents) and halftones (photographs and other artworks that are composed of varying shades of gray) at a variety of scaling percentages.

Upon entering VersaScan, you're presented with a Welcome screen from which you'll most likely want to make the Change Scanning Parameters selection. The next screen is really the place where you're able to manually customize your scanning parameters. It's important to remember to place the document you want to scan in the middle of the unit's paper-feed mechanism if the document is less than 8.5 inches wide. That's because the unit's sensing device is in the center of the MS-300A.

The Mode menu enables you to select either line art or halftone modes. When using the halftone mode, you can make 12 further selections to control the overall darkness (grain sizes) of the image. You then have a choice of 14 increments for both brightness and contrast.

After an image is scanned, you can perform basic editing tasks using Fat Bits, similar to the feature found in Apple's MacPaint program. You also have the option of saving the image as a MacPaint file if you want to edit it in that program. Scanned images can be saved in any of five formats; how they are saved depends on how you intend to use them.

For example, images to be printed directly to a LaserWriter should be saved in the PostScript format. The Non-compressed format is the best selection if you intend to use an image in a PageMaker document. It's important to set your scanning parameters for reduction or enlargement *before* the image is scanned.

By the time this review is published, Microtek will have released a number of new products for the MS-300A. These include an enhanced version of its VersaScan software (VersaScan Plus), optical character recognition software (MacOCR), and a connection to the Mac's high-speed Small Computer Systems Interface (SCSI) port.

—Jack Bell



The MS-300A image scanner digitizes photos and line art for use in Mac applications.

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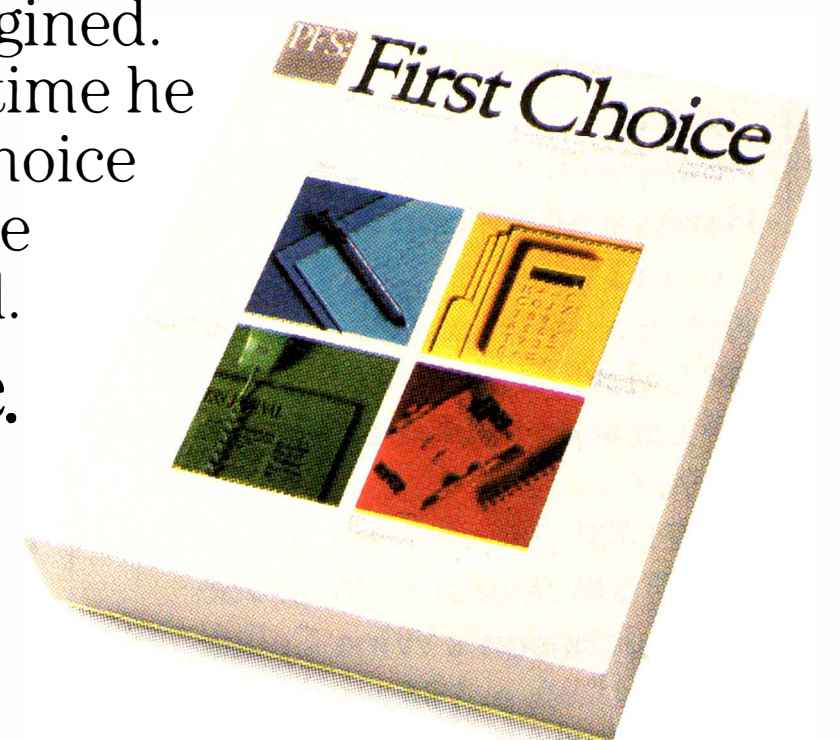
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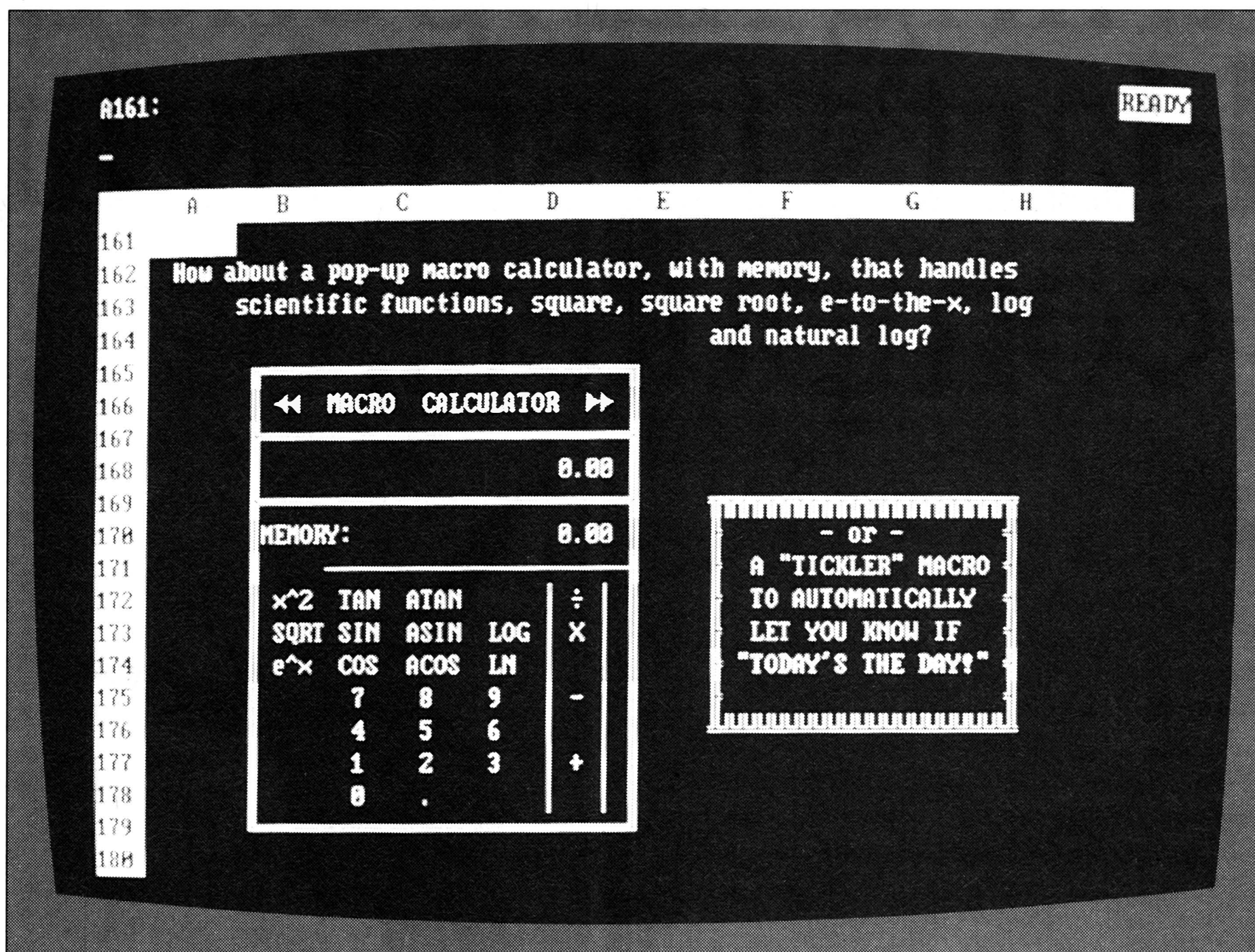
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Many of Macropac's 101 Macros for Lotus 1-2-3 can be imported into worksheets.

Mastering Macros In Lotus 1-2-3

101 MACROS FOR LOTUS 1-2-3 is a collection of general-purpose macros for use with Lotus 1-2-3 release 1A or 2.0; runs on the IBM PC family and compatible computers; versions also available for the DEC Rainbow and Hewlett-Packard 150; non-copy protected; \$69.95 retail; Macropac International, 19855 Stevens Creek Blvd., Suite 168, Cupertino, CA 95014; (408) 996-8143. (For more information, circle 256 on the Free Information Card.)

The difference between merely using Lotus 1-2-3 and, on the other hand, actually mastering it, is roughly the difference between shooting a hole in one at miniature golf and shooting one at Pebble Beach. And just as an entire industry exists for golfers who want to become better, part of the personal computer industry exists solely to help 1-2-3 users get more from their spreadsheets.

As with golf, it can cost a lot to learn about 1-2-3. An eight-hour class that covers only beginning concepts can cost more than the program itself. But there are plenty of alternatives if you would rather spend time than a lot of money to improve basic skills.

At \$70, 101 Macros for Lotus 1-2-3 is one of those cost-effective alternatives. There's nothing fancy about the program or the packaging. It is a collection of macros that do everything from re-

calculating a single cell to exchanging data from a row into a column or vice versa. The program consists of a collection of .WKS files compatible with release 1A. Version 2.0 will automatically convert them into the .WK1 files it requires. Four of the files contain macros that can be loaded into existing worksheets. Other files on the disk do such things as list all of the macros, provide general tips for using 1-2-3, help users write their own macros, or offer a word processing template for both writing and printing memos.

The four working files have macros labeled alphabetically, all of them in a format that can be imported using the /File, Combine, Copy, and Named Range commands. Since range names are lost during the process, the user has to name them again before they can be activated. That's probably for the best, because Macropac obviously stretched to name a few. In the "Y" list, there's a macro entitled "X" for "Xfr (Transfer) Absolute Value." Renaming that "transfer" will probably clarify things.

The biggest challenge in using 101 Macros for Lotus 1-2-3 may be deciding which of the macros to use. Because some are similar, it's worth the time to read through the detailed descriptions in the manual before importing macros. In the YMAC file, for instance, the "I" macro inserts a blank row while copying the format from the row above. In the ZMAC file, the "I" macro inserts a row while copying the

data and format from the row above. Some of the macros merely save keystrokes; for example, allowing you to type Alt-F rather than /File, Combine, Copy, Entire to combine worksheets. Others perform functions that are possible, but difficult, in 1-2-3, such as inserting column letters and row numbers into a printout without affecting the worksheet itself.

Users who do take time to read through the manual rather than just scrolling through the shortened descriptions on the disk are also likely to come up with ideas for creating their own macros or reach the conclusion that some of them would be even more useful customized. The design of 101 Macros for Lotus 1-2-3 makes it possible to experiment or use the mini-programs as building blocks for other macros without destroying the original.

Because the program was originally written to work with release 1A, a few of the macros duplicate menu features built into release 2.0. Thus, 1A users will be interested in the macro that adds password protection to worksheets, while 2.0 users will find the same capability built in. Although the macros are in .WKS files for 1A compatibility, Macropac says the program was revised, not just repackaged, after the release of version 2.0.

In addition to offering a full 101 macros, this program helps demystify 1-2-3 macros in general. The manual contains a clear explanation of how to create and use macros. It cautions, for instance, that users need to be careful about inserting and deleting rows and columns once they've written macros. If you have a macro in cells AB2 through AZ7 and then delete row 3, your macro is a goner because whatever was in AB3 through AZ3 is deleted, too. Macropac recommends reserving the top of a worksheet for macros, so you'll always be aware of them. And the more aware users are of macros, the more likely they are to use them. After a while, you may begin to wonder how you got along without them.

101 Macros for Lotus 1-2-3 isn't really for users who can handle macros with ease. Still, such people may find a gem or two that will help them hit even more holes in one. The program is a good bet, though, for users looking for an edge, but who haven't got quite enough experience to get it on their own. It's like the caddy who always knows which wedge will get you onto the green.

—Sandra R. Reed

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PRODUCT REVIEWS

Slideless Slide Show For Groups

DATASHOW SYSTEM is an electronic transparency system for displaying computer images through an overhead projector. It consists of a "projection pad," Sayett Technologies' Showmaker software, and a remote control for use with the software. It works with an IBM PC or compatible with an IBM Color Graphics Adapter, Enhanced Graphics Adapter (in CGA mode), or compatible, and a transmissive overhead projector; \$1,270 retail; Eastman Kodak Co., Motion Picture and Audiovisual Products Division, 343 State St., Rochester, NY 14650; (800) 44-KODAK. (For more information, circle 252 on one of the Free Information Cards.)

Datashow provides an easy way of showing slide-like presentations without having to make 35mm slides or buy a special projection system to hook up to your computer. In addition, anything that you do on your computer can be projected as you are doing it, a handy feature for conducting computer training sessions.

The lightweight device is a liquid crystal display mounted on a flat "projection pad" that you place over the transparency tray in an overhead projector, a device many offices already have. You then plug the pad into a per-

sonal computer's RGB display port, and in turn, connect the computer monitor to the receptacle provided on the pad's cable. Your computer must contain a CGA or EGA (in CGA mode) board. It does not work with a monochrome system. The only other things you'll need are a projection screen or white wall, and an audience.

The projected image is clear, right down to the individual pixels that make up text characters. When you use the page down key, the result is a fade-out of the previous screen and fade-in of the next. Now the bad news: It only projects black and white. Actually, the image has a blue tint due to the color of the liquid crystal. The contrast is good, however, as long as the room lighting is turned off or dimmed.

If you are preparing graphs and pie charts from a color program, you should be aware of which colors will project as black and which white. Green, cyan, brown, and white will all come across as white; and magenta, red, blue, and black as black, so don't make two consecutive pieces of your pie chart red and blue, or green and brown.

The Showmaker software is included, with an accompanying remote control device. This package, made by Sayett Technology for Eastman Kodak, has three parts: one memory-resident section to enable you to capture screens from application programs; one section that enables you to organize the screens

to be presented in any order; and one part that simply plays the shows you've created. Showmaker requires a total of 256k, while the memory-resident portion takes up only 18k.

Showmaker, which is not copy protected, can be used without consulting the manual. After you've captured the screens you wish to use in your presentation, the Presentation Editor portion guides you through the process of arranging them. A list of commands is at your disposal when you strike F1, the help key.

With this program, you can define how long you wish each screen to stay up before going on to the next one; you can specify slow or fast blinking or "reverse video" (changing the background color from light to dark or vice versa) for any screen; and you can "split" a screen, showing two screen images simultaneously for comparison purposes. The remote control lets you choose any screen out of sequence; freeze a screen; and move the image up, down, left or right. By creating a show with the software and controlling the visuals with the remote device, you can display a presentation that runs automatically and won't cause you to do a lot of fumbling. The Datashow and remote control also work with Brightbill Roberts' Show Partner software, a similar but more elaborate program.

Kodak also plans to release a read-only floppy disk player in the near future that has a footprint a little bit bigger than a 5.25-inch disk and will play back a preprogrammed show. This way, you can pack up your Datashow and portable disk player with your presentation disks, and only have to worry about the availability of an overhead projector at your destination.

For live training sessions, the system is most efficient. A word processing or spreadsheet instructor can accommodate a classroom of students rather than one or two people peering over his or her shoulder.

Though color is sacrificed and the quality isn't quite as sharp as images projected through overhead transparencies created with a good laser printer, Datashow is a relatively inexpensive and quick alternative to other media. And unlike slides or transparencies, which must be created in advance, Datashow gives you the option to present a computing session live from the keyboard. Thus, you can adjust your visuals to audience needs on the fly.

—Stephanie Makrias



Datashow sits on an overhead projector's transparency tray; remote control is included.

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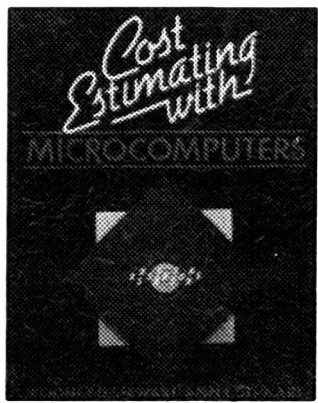
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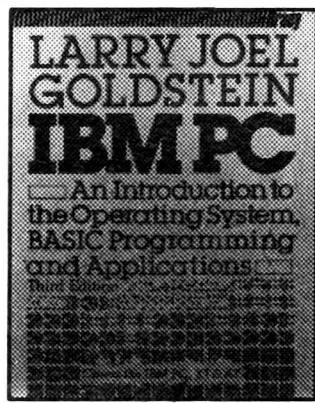
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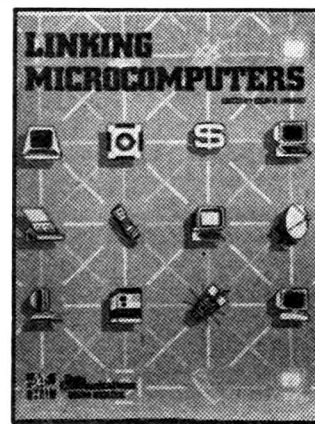
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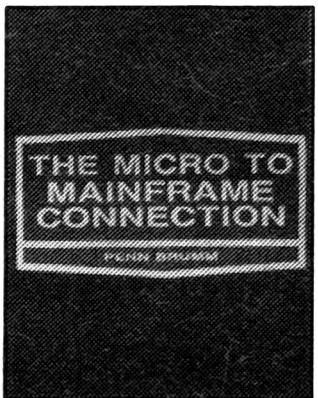
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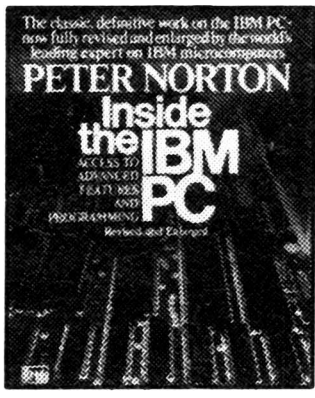
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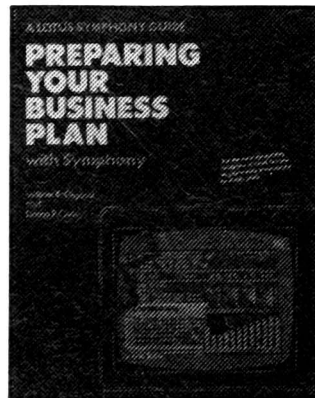
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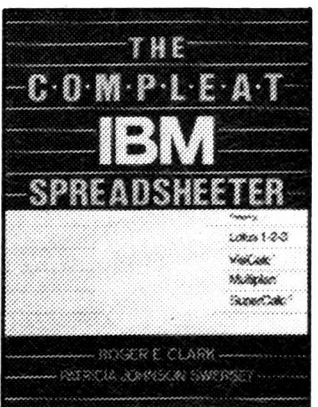
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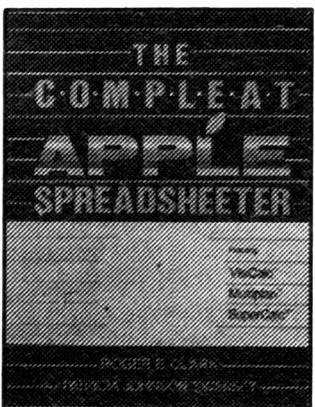
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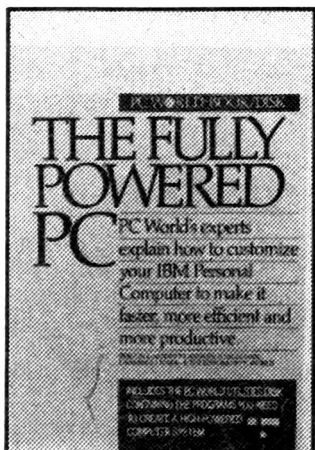
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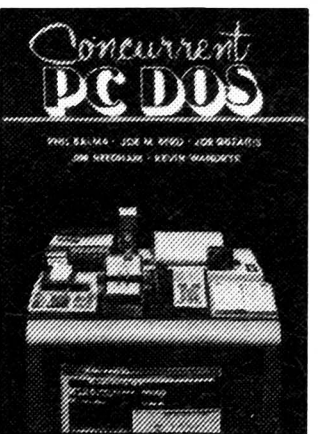
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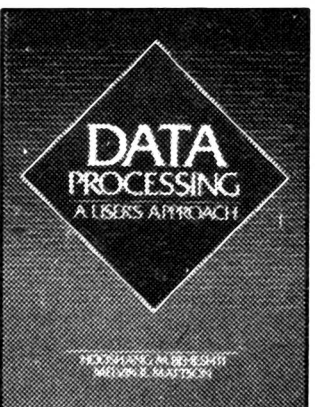
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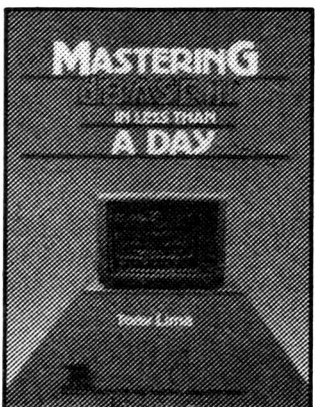
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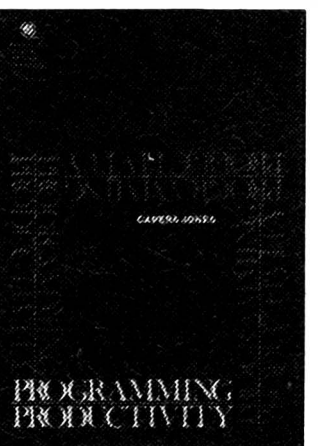
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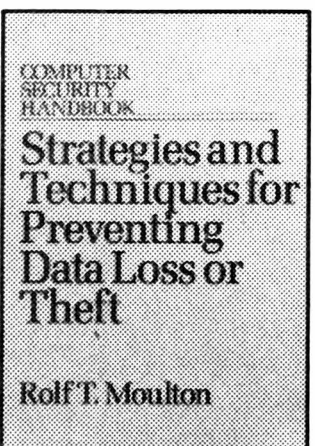
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Text And Graphics: Together At Last

INSET 2 is a RAM-resident utility program (it consumes 128k) that enables you to print text and graphics on the same page; non-copy protected; \$99 retail; American Programmers Guild, 12 Mill Plain Road, Danbury, CT, 06811; (203) 794-0396. (For more information circle 255 on the Free Information Card.)

A memo, letter, or report that contains charts or graphs is an eye catcher. The charts, especially if in color, draw attention and quickly illustrate points within the text. Yet, combining text and graphics is often difficult. Most graphics and word processing packages have no provision for mixing their separate outputs on the same page.

A relatively expensive solution is to buy a desktop publishing program like Ventura Publisher, which can read in and format text and graphics from a variety of programs. At the other extreme is the do-it-yourself procedure of putting the paper through the printer twice, leaving sufficient white space during the first pass to incorporate the graphic the second time through. Though no extra software is required here, the only control you have over the page is via a lot of trial and error.

Inset 2 takes the middle ground between desktop publishing and printer gymnastics. In addition, it is easier to

use and more powerful than the original Inset version was.

Like the original Inset, Inset 2 resides in RAM. Once activated, Inset enables you to capture a graphic image and save it. You then insert the file name of the saved graph, surrounded by brackets, where you want the image to appear in your word processing document.

You activate Inset 2 by pressing the Shift-PrtSc or the Alt-PrtSc key combination simultaneously. You can use the Shift and PrtSc combination when working with text-based files and many graphics-based files. But when using some graphics packages, including Chart-Master from Decision Resources, you have to use the Alt-PrtSc combination. The Inset manual mentions that both combinations are available, but doesn't explain when and why you have to use one or the other.

There are some other rough spots in the manual. For example, subheadings for the various menus are explained alphabetically. This forces you to frequently flip through the manual to learn each of the commands under a menu heading. It would have been better to group the explanation of commands under their menu heading. The chapter that describes the setup procedure refers you to Appendix D for a list of printers supported by Inset 2. Unfortunately, there is no Appendix D. Fortunately, the table of contents correctly states that the list of supported printers appears in Appendix C.

One of the major improvements in

Inset 2 is the ability to capture images from an EGA monitor. Since the program captures screen images, the resolution of the graph is only as good as the pixel resolution on-screen. With Inset 2, you can print a graph with the sharper 640-by-350-pixel resolution of EGA display. Inset 2 also works with CGA, Hercules monochrome graphics, and the AT&T monochrome or enhanced video display.

Inset 2 enables you to modify the graphic image before you print it. The edit menu contains commands for drawing lines, boxes, and circles; changing the width of lines; changing colors; and magnifying a portion of the screen for more detailed work. In addition, the edit menu enables you to choose the font, orientation, and size of the text in the graph. Italics is included with Inset 2 and other fonts can be used.

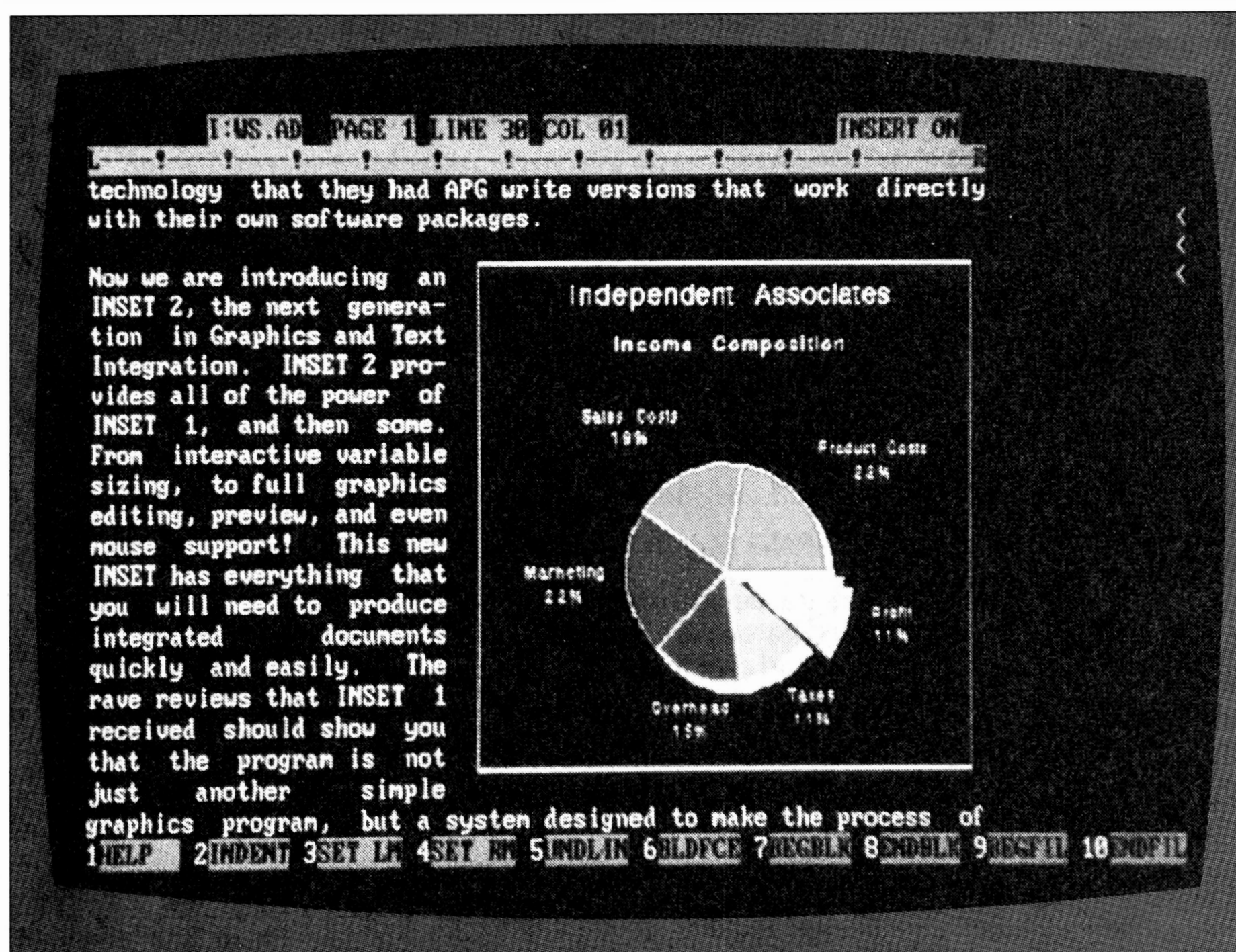
The Modify menu enables you to rotate the image 90 degrees. You can also modify the image's size, change the colors, put a border around the image, or select a single or double pass mode when printing. Another selection on the Modify menu enables you to preview how the image will appear with the text, a feature that wasn't available on the original Inset.

Inset 2 contains an easier installation routine than the original version. The setup choices include the type of screen display, printer used, printer width, and pitch. A wide variety of printers are supported, including the Brother DM45; Canon LBP-8 laser printer; Diablo 630; Epson FX, RX, and JX series; Hewlett-Packard LaserJet; IBM Graphics Printer; IBM Color Printer; Epson LQ 1500; NEC P2, P3, and P5; Toshiba P-1340, P-1350, and P-135; and Xerox 4045.

Images saved with the original Inset cannot be used with Inset 2. Users can convert their old graphic files to work with Inset 2 using a program included with the Inset 2 disk.

Despite some shortcomings in the manual, Inset 2 is an easy to use and powerful tool for combining text and graphics. You can use it simply as a way to combine a graph into a word processing document, or you can use the editing functions to tinker with the appearance of the graph before combining it with the document. Anyone who wants to add graphics to a printed page—but doesn't need the more sophisticated features or expense of a desktop publishing program—will find Inset 2 to be a low-cost alternative.

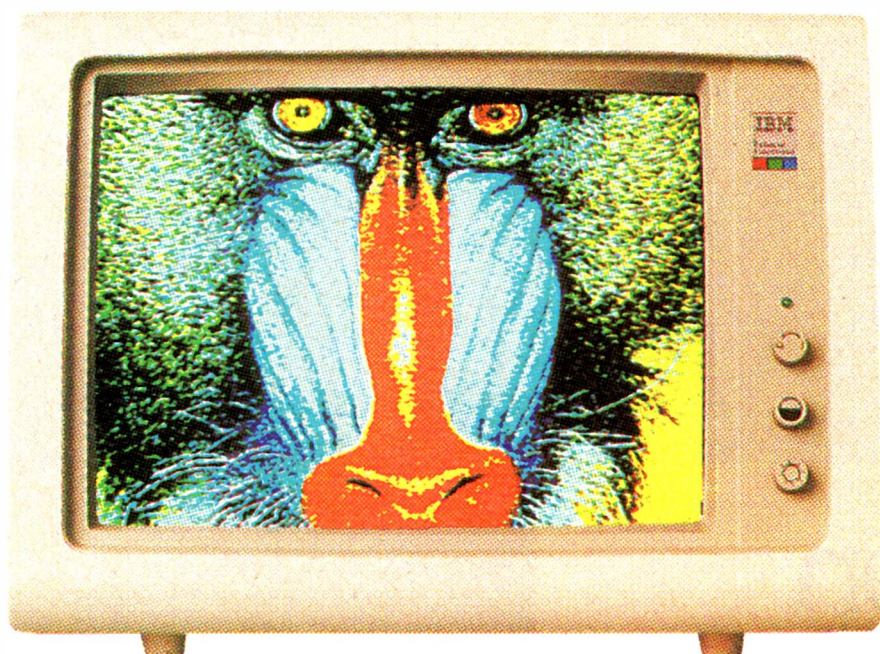
—Patrick Honan



Inset 2 enables you to preview the way the graph will look inserted in the text.

EGAWONDER™

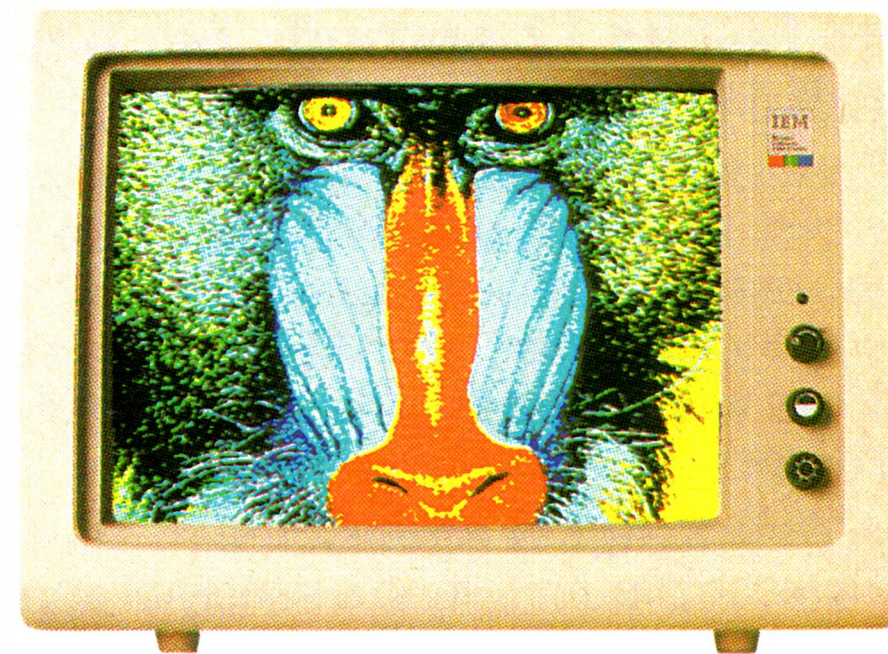
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**Any Software on
an EGA Monitor**



**Any Software on a
TTL Monochrome Monitor
(or Compaq Portable)²**



**Any Software on an RGB
Color Monitor³
(or Composite, IBM Portable)**

Upgrade to EGA without an EGA Monitor

The unique ATI EGA WONDER allows upgrade to the new EGA graphics standard without the purchase of an expensive EGA monitor. EGA WONDER runs EGA, CGA, MDA, Hercules and 132 column software on EGA Color, RGB Color, TTL Monochrome and Composite monitors. Extremely flexible, EGA WONDER maintains downward compatibility to both existing software and existing monitors. On the internal monitor of a Compaq PC Portable, EGA WONDER displays EGA, CGA, MDA and Hercules software via an optional expansion module.² For EGA monitor users, the ATI EGA WONDER improves the display of CGA software by producing high resolution 8x14 text and double scanned graphics. Old CGA software

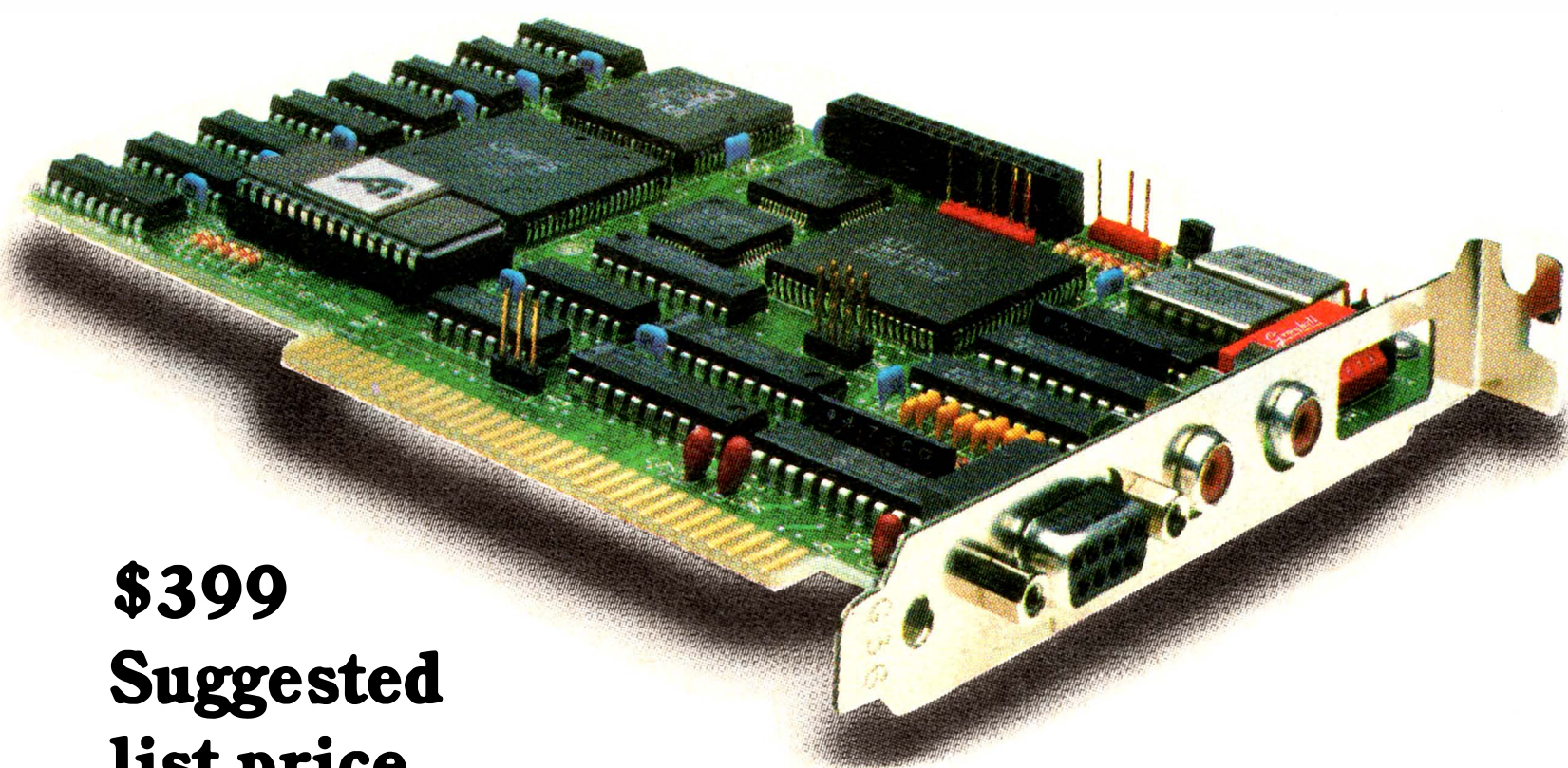
is now displayed with EGA quality. Completely compatible to IBM's EGA, ATI's EGA WONDER performs smooth scrolling, pixel panning and windowing. No memory modules are required because 256K of video memory is a standard feature. EGA WONDER is the only card able to display EGA software on the internal monitor of both the IBM PC Portable and the Compaq PC Portable. EGA WONDER provides an NTSC Composite signal for interface to a Polaroid Palette.

SoftSense Automatic Mode Switching

User friendly and easy to use, the ATI EGA WONDER has built-in SoftSense Automatic Mode Switching. It is actually able to sense and automatically switch between EGA and CGA color modes or between EGA, MDA and Hercules monochrome modes. The ATI EGA WONDER is compatible at the hardware level to the IBM Enhanced Graphics Adapter, the IBM Color/Graphics Adapter, the IBM Monochrome Display Adapter and the Hercules Graphics Card to minimize software incompatibilities.

EGA WONDER is now available from all major computer stores, call us today at (416) 477-8804 for more information.

\$399
Suggested
list price



Trademarks IBM PC Portable - EGA - CGA - MDA - International Business Machines - Compaq - Compaq Computer Corporation - Hercules - Hercules Computer Technology - Polaroid Palette - Polaroid Corporation.

1. Any Software, Any Monitor, Any Time applies to IBM graphics, standards, monitors, software.
2. Optional Compaq Expansion Module (no 132 Columns) Suggested list price \$99.
3. EGA, MDA, Hercules software displayed via interlacing. Flickering effect of interlacing reduced with purchase of anti-glare screen filter.



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To convert typewritten pages into editable text, an OCR option is available.

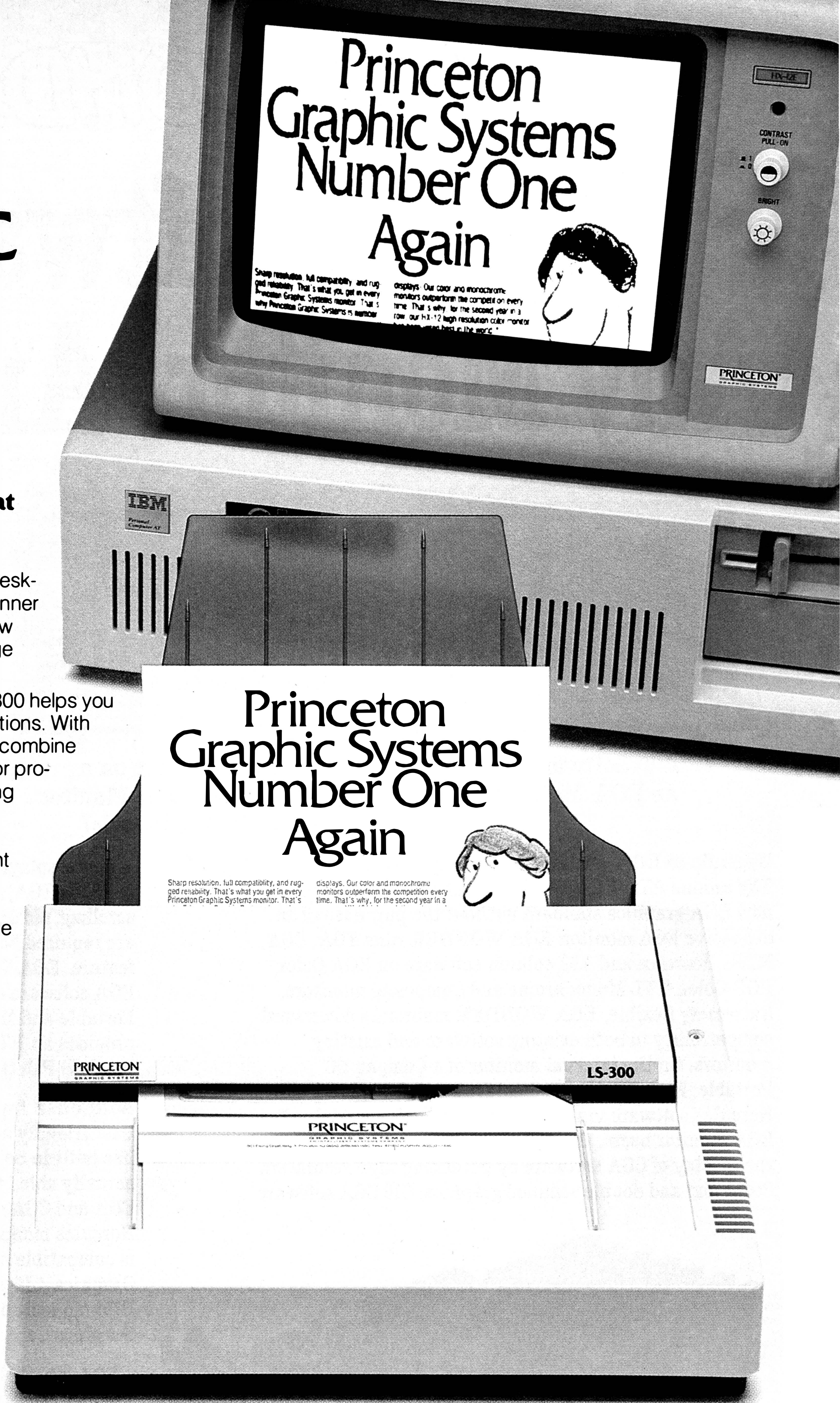
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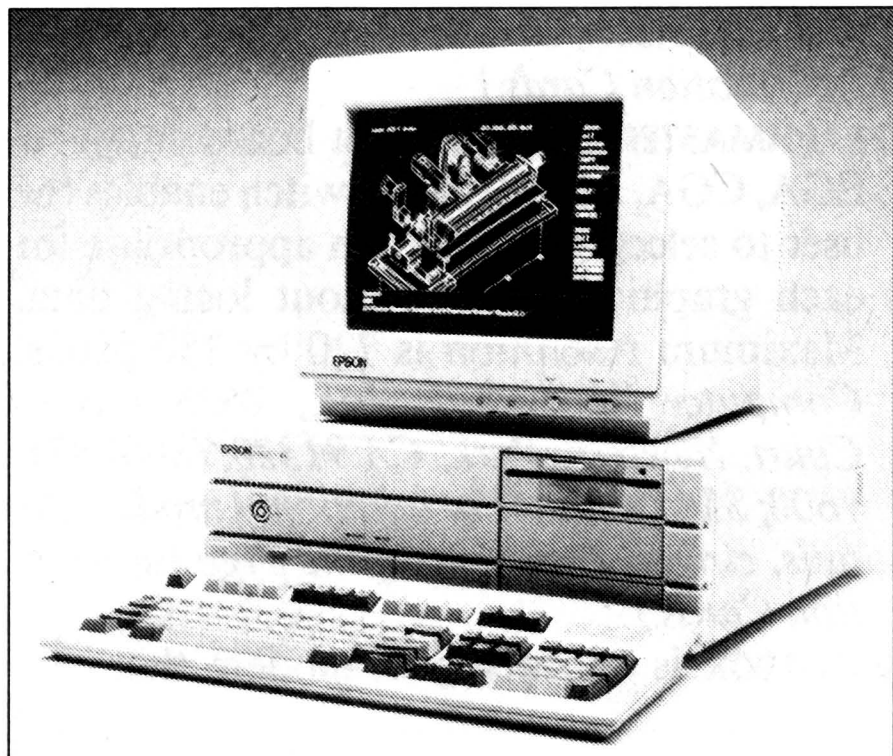
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Epson's 80286-Based Equity III

SYSTEMS



The Equity III PC AT compatible has a selectable clock speed of 6/8/10MHz.

EQUITY III is an AT compatible that features an 80286 microprocessor with 6/8/10MHz selectable clock speed, 640k of RAM, a 1.2Mb floppy disk drive, a key-lock switch, an enhanced AT-style keyboard, and a parallel and serial port. Options include a 40Mb Winchester disk drive with an access time of 28 milliseconds, a 360k or 1.2Mb floppy disk drive, a color graphics board, and EGA board. *Epson America, Inc., Computer Products Division, 2780 Lomita Blvd., Torrance, CA 90505; (213) 539-9140; \$2,695 for the single floppy configuration, \$3,895 for the single floppy/40Mb hard disk configuration, retail. (For additional product details, circle 108 on one of the Free Information Cards.)*

BABY BLUE 16 is a 16-bit 8088 IBM PC compatible with 256k, one 360k floppy drive, an AT-style keyboard, RGB color, a composite adapter supporting 640-by-200-pixel resolution graphics, a serial port, parallel port, and game port. *Baby Blue Computer Systems, 303 Hegenberger Road, Oakland, CA 94621; (415) 636-1401; \$399 retail. (For additional product details, circle 105 on one of the Free Information Cards.)*

CCC-365/AT is available in a variety of 286-based configurations, all of which have 1Mb of RAM, 6/8MHz switchable operating speed, wait/no-wait switchable memory, a 1.2Mb floppy drive, a Western Digital controller card, a parallel and a serial port, a 200-watt power supply, and an enhanced AT-style keyboard. Users can choose a 30- or 40Mb hard drive. *Computer Components Corp., PO Box 12017, Research Triangle Park, NC 27709; (800) 843-7012; \$2,395 and up, depending on configuration, retail. (For additional product details, circle 106 on one of the Free Information Cards.)*

DESKPRO 286 MODEL 40 features a 40Mb fixed disk drive, 640k of RAM, a 1.2Mb

disk drive, seven expansion slots, and a 101-key enhanced keyboard. *Compaq Computer Corp., 20555 FM 149, Houston, TX 77070; (713) 370-0670; \$4,999 retail. (For additional product details, circle 107 on one of the Free Information Cards.)*

PC-7000A and **PC-7100** are two portable computers from Sharp Electronics. The PC-7000A includes dual 5.25-inch floppy disk drives, 320k of RAM, a 25-line by 80-character illuminated crystal display, an AT-style keyboard, serial and parallel ports, and MS-DOS 2.1. The PC-7100 sports the same configuration, except for the inclusion of a 20Mb hard disk mounted on an internal expansion card. *Sharp Electronics Corp., Systems Division, Sharp Plaza, Mahwah, NJ 07430; (201) 529-9500; \$1,795, PC-7000A; \$2,795, PC-7100; retail. (For additional product details, circle 109 on one of the Free Information Cards.)*

THE PORTABLE OFFICE is a 22-pound Nicad battery-powered three-piece system comprised of a computer, printer, and facsimile machine. It features an enhanced Data General/One Model II portable computer with back-lighted LCD screen and internal 10Mb Winchester drive, Medbar's Port-A-Fax machine, and a Diconix 150 ink jet printer. An added EPROM chip contains Medbar ROM-resident software. *Medbar Enterprises, Inc., 71-08 51st Ave., Woodside, NY 11377; (718) 335-0404; \$479 retail. (For additional product details, circle 110 on one of the Free Information Cards.)*

SAM 300I IBM PC AT compatible includes 640k of RAM, a 1.2Mb floppy disk drive, two serial ports, one parallel port, a color graphics board, a clock/calendar, a 195-watt power supply, and a keyboard. *HiTech International, Inc., 1180-M Miraloma Way, Sunnyvale, CA 94086; (408) 738-0601; \$995 retail. (For additional product details, circle 111 on one of the Free Information Cards.)*

SM 286/12 is an 80286-based system capable of supporting up to 12 users. The standard configuration is 1Mb of RAM, five serial ports, one parallel port, a 360k floppy disk drive, a 36Mb (formatted) hard disk drive, a 60Mb streaming tape drive, and one terminal, plus the Xenix operating system. The system can be expanded to include 15Mb of RAM, 256Mb of hard disk storage, and 12 terminals. *Gulfstream Micro Systems, 1065 S. Rogers Circle, Boca Raton, FL 33431; (800) 443-0500; \$7,585 retail. (For additional product details, circle 112 on one of the Free Information Cards.)*

V-MARC 88, a vertical 5.7-pound lap-size computer, uses a 16-bit 8088 microprocessor running at 8MHz with an 8087 math software set. The unit includes a bidirectional 40- (or 80 in compressed mode) col-

umn printer, a QWERTY keyboard with numeric keypad, seven slots for RAM or EPROM modules, and a parallel port. Each plug-in application cartridge has up to 128k of memory; modules are available in the areas of insurance, banking, moving and storage, graphics, finance, fuel consumption, communications, and medicine. *V-Marc, Inc., 8081 Zionsville Road, PO Box 68886, Indianapolis, IN 46268; (317) 872-7224; \$1,000 to \$2,000 direct order. (For additional product details, circle 113 on one of the Free Information Cards.)*

Z-148 is a 20Mb hard disk drive system featuring the 8088 processor, which operates at speeds of 4.77/8MHz with no wait states. This includes one 5.25-inch floppy disk drive, 256k, a parallel and serial port, RGB/composite video output, an 8087 socket, and 77-watt power supply. MS-DOS 3.1 is included. *Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; (312) 391-8860; \$2,199 retail. (For additional product details, circle 114 on one of the Free Information Cards.)*

Z-248 combines zero wait-state technology with an Intel 80286 processor running at 8MHz. It has an EGA card, 512k of RAM, a 20Mb hard disk, a 1.2Mb hard disk, and six open slots. Other configurations are also available. *Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; (312) 391-8860; \$4,399 retail. (For additional product details, circle 115 on one of the Free Information Cards.)*

Z-386 uses Intel's 80386 32-bit processor and operates at 16MHz. It has AT software compatibility and expanded memory specifications support. Features include 10 bus slots (six are open), 1Mb of RAM, a combined floppy-Winchester controller, serial and parallel ports, and sockets for 80287 or 80387 coprocessors. *Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; (312) 391-8860; \$6,499 for the 40Mb version, \$7,499 for the 80Mb version. (For additional product details, circle 116 on one of the Free Information Cards.)*

PERIPHERALS

AST-5000 is a Small Computer System Interface-compatible (SCSI) hard disk subsystem and streaming cartridge tape backup. Users can select storage capacities of 120, 240, or 320Mb. The system can be expanded up to 2.2Gb. It features an average access time of 28 milliseconds and a 125Mb cartridge tape backup, and supports up to eight peripheral devices, including multiuser and LAN systems. *AST Research, Inc., 2121 Alton Ave., Irvine, CA 92714; \$7,795, 120Mb; \$9,995,*

PRODUCT LISTINGS

240Mb; and \$11,195, 320Mb; retail. (For additional product details, circle 117 on one of the Free Information Cards.)

AUTO PLOT is a D-size open frame flatbed pen plotter with a 16-bit processor. It makes drawings of up to 22 by 34 inches with eight pens (optional) at 0.001-inch resolution. Plot speed is selectable up to 10 inches per second. The plotter has a 256k buffer, expandable to 1Mb, and its HPGL command set is compatible with most CAD programs, including AutoCAD. *GTCO Corp., 7125 Riverwood Drive, Columbia, MD 21046; (301) 381-6688; \$4,495 retail. (For additional product details, circle 118 on one of the Free Information Cards.)*

DDE PC DATA BUFFER is an internal buffer that installs into a long card slot. It will support both a parallel and serial printer and/or plotter using any standard IBM PC parallel cable or IBM PC AT serial cable. It is available in memory sizes from 256k to 1,024k. Power consumption is seven watts. *Data Doc Electronics, Inc., 9415 Neils Thompson Drive, Austin, TX 78759; (512) 836-7323; \$479.95 to \$629.95, retail. (For additional product details, circle 119 on one of the Free Information Cards.)*

F2010 COMPACT LASER PRINTER is a 10-page per minute printer with 1.5Mb of RAM that produces documents at 850 characters per second at 300 dots per inch. Font styles, emulation modes, character code sets, and feed

and stack options are all front panel-selectable. It has dual 250-page paper feed trays, a collator, and a sorter with a 150-page top bin and four 25-page lower bins. The F2010 handles legal, letter, A4 and B5 size paper. *Kyocera Unison, Inc., 3165 Adeline St., PO Box 3056, Berkeley, CA 94703; (415) 848-6680; \$5,295 retail. (For additional product details, circle 120 on one of the Free Information Cards.)*

FM-2400E is a Hayes-compatible 2400-bits per second modem for asynchronous or synchronous transmission in 2400, 1200, or 300 bits per second. It is compatible with most American and international dial-up standards. *Franklin Telecom, 31320 Via Colinas #113, Westlake Village, CA 91362; (818) 706-1186; \$460 retail. (For additional product details, circle 121 on one of the Free Information Cards.)*

FX-BM88 facsimile board enables the sending of a file or a scanned image to a Group 3 (CCITT International Standard) facsimile machine and the ability to receive documents. A document received from a facsimile machine can be viewed on a computer display, edited on-screen, and then printed out using a dot matrix or laser printer. It features a polling function and facilities for creating a telephone number directory as well as displaying and recording all facsimile activities. An integral modem provides high-speed transmission of up to 9600 bits per

second. *Panasonic Industrial Co., One Panasonic Way, Secaucus, NJ 07094; (201) 348-7000; \$1,000 retail. (For additional product details, circle 122 on one of the Free Information Cards.)*

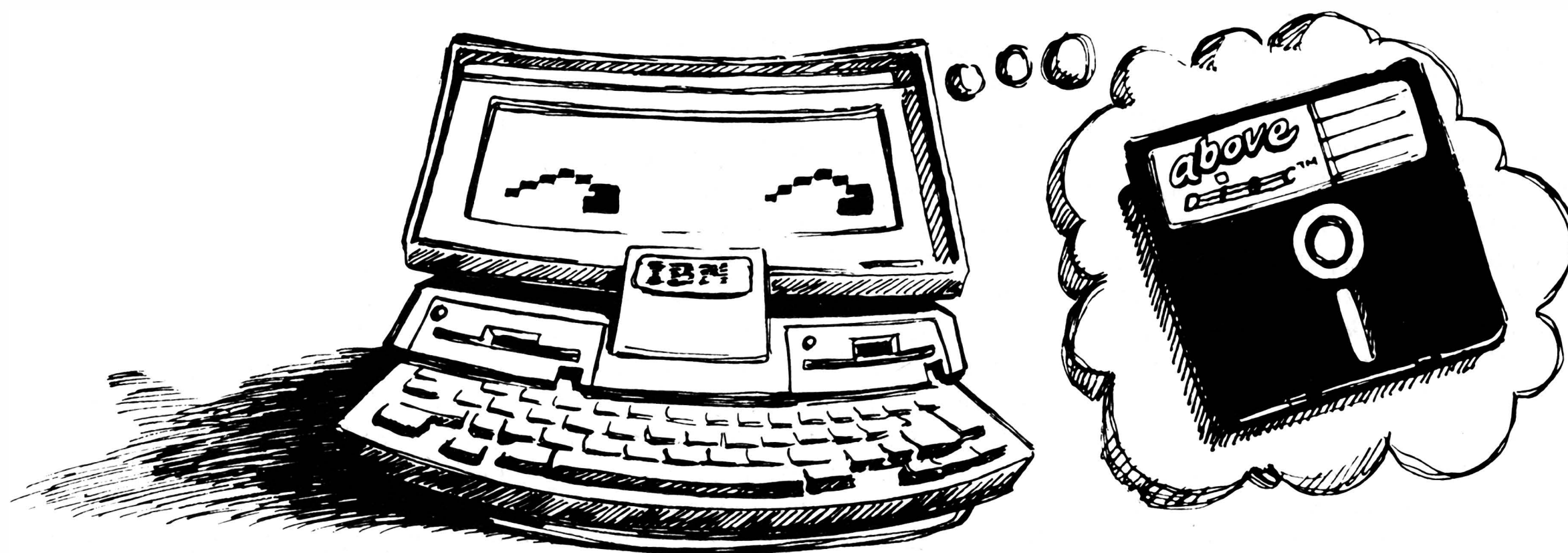
FX-RS505 is a high-resolution flatbed image scanner that transfers graphic images of characters and artwork with a resolution of up to 400 dots per inch at six seconds per page. It has 16-shade monochrome output and multimode resolution. *Panasonic Industrial Co., One Panasonic Way, Secaucus, NJ 07094; \$1,300 retail. (For additional product details, circle 123 on one of the Free Information Cards.)*

GRAPHMASTER enhancement board supports EGA, CGA, and MDA. A switch enables the user to select the resolution appropriate for each graphics mode without losing data. Maximum resolution is 720 by 350 pixels. *Computer Peripherals, Inc., 2635 Lavery Court, Newbury Park, CA 91320; (800) 854-7600; \$545 retail. (For additional product details, circle 124 on one of the Free Information Cards.)*

GTX-100R is an intelligent modem that ena-

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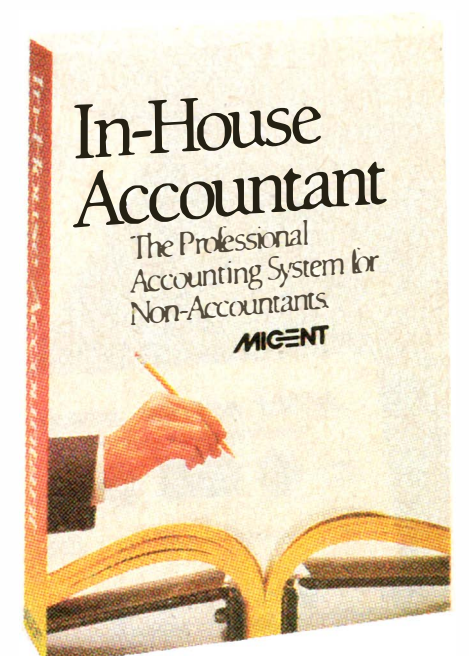
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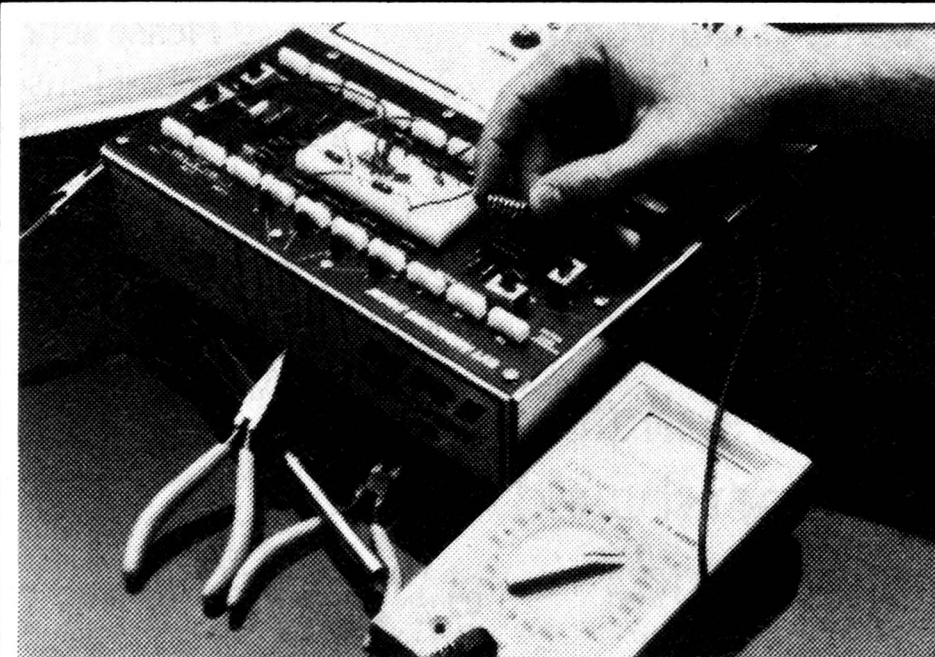
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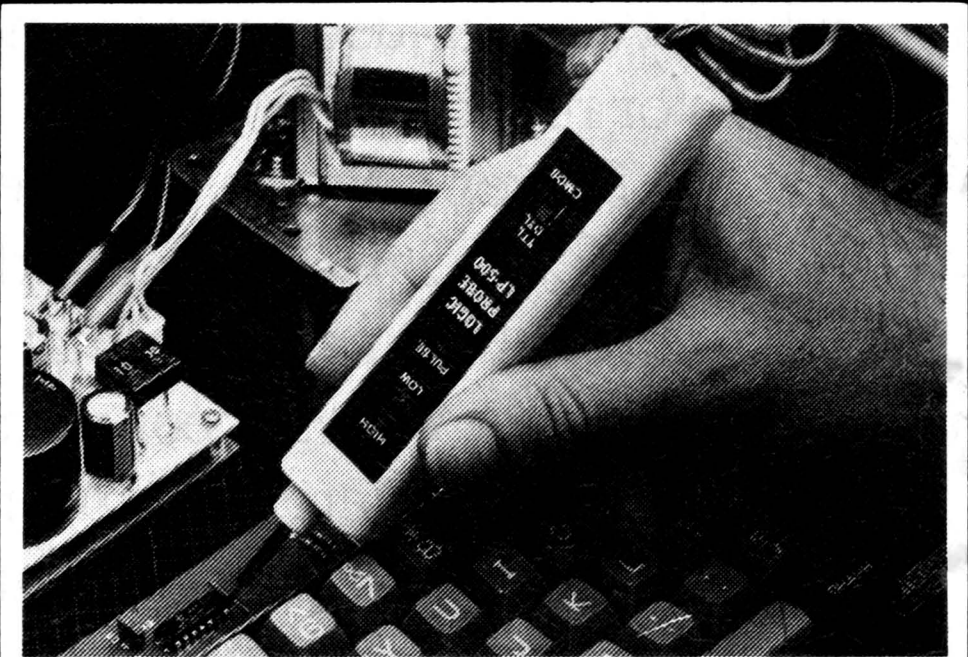
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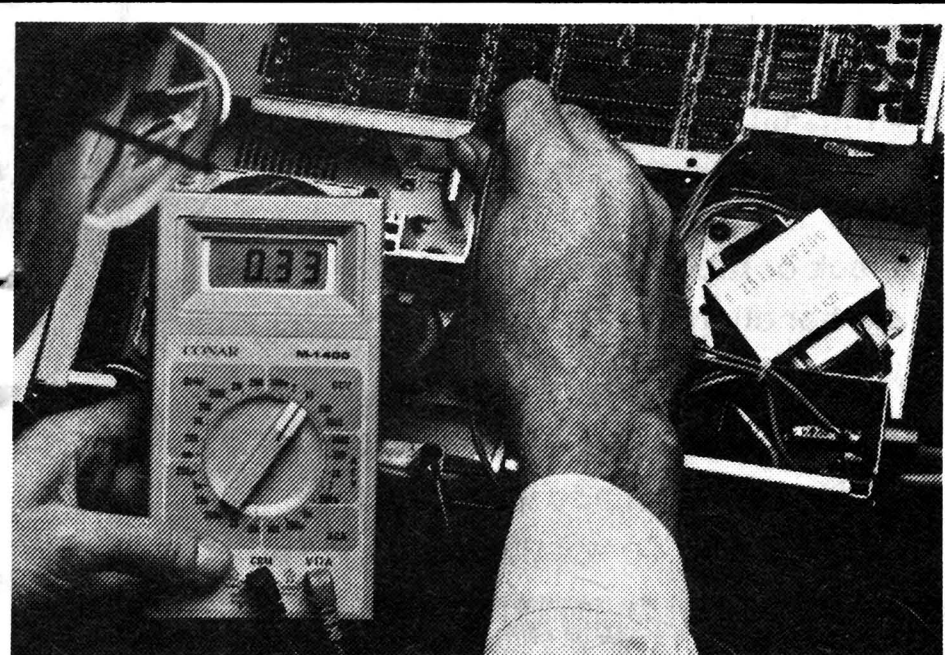
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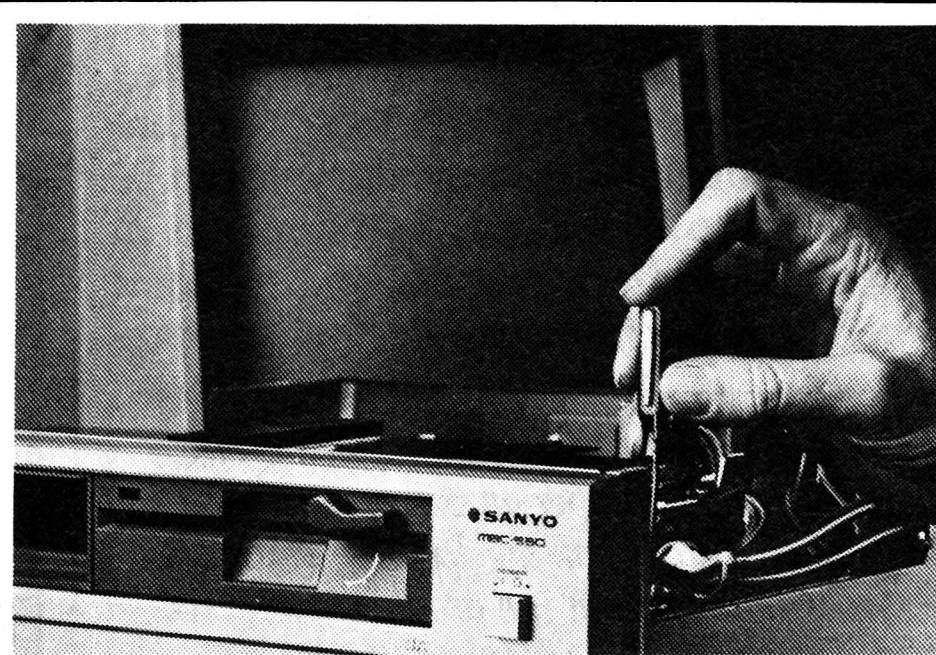
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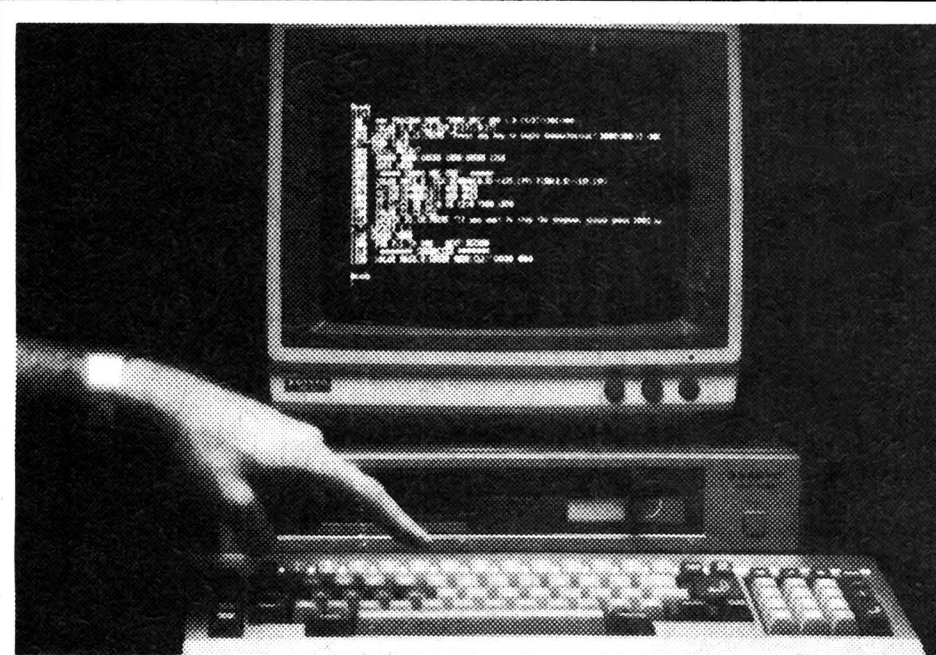
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(For More Information Circle 187)

PRODUCT LISTINGS

bles a remote caller to operate a distant computer. It incorporates dial-back verification and password security. It is Bell 212A compatible and has auto-dial/auto-answer capability. *AO Electronics, Inc., 2137 Flinstone Drive, Tucker, GA 30084; (404) 491-8044; \$895 retail. (For additional product details, circle 125 on one of the Free Information Cards.)*

INTERNAL DISK CARTRIDGE SYSTEM can be installed in the Tandy 3000 HL or the Tandy 3000 floppy drive system for storage of data on removable cartridges. This is a 5.25-inch, 20Mb system with an average access time of 40 milliseconds. For added storage, a second system can be mounted. Both units can be installed by the user. *Tandy Corp./Radio Shack, 1800 One Tandy Center, Fort Worth, TX 76102; (817) 878-4969; \$1,799 retail; \$999 for a second system; \$84.95 per 5.25-inch disk cartridge. (For additional product details, circle 126 on one of the Free Information Cards.)*

LASERPOWER II 10-page per minute laser printer features 18 resident type fonts and a page description language for the generation of custom forms, business graphics, and bar codes. It has a monthly duty cycle of 15,000 pages and a total printer life of 600,000 pages. Emulations include Diablo 630, Epson FX-80, and the Hewlett-Packard LaserJet. Letter and legal-size 250-sheet input and output trays are included. *CMS, 3080 Airway Ave., Costa Mesa, CA 92626; (714) 549-9111; \$3,995 retail. (For additional product details, circle 127 on one of the Free Information Cards.)*

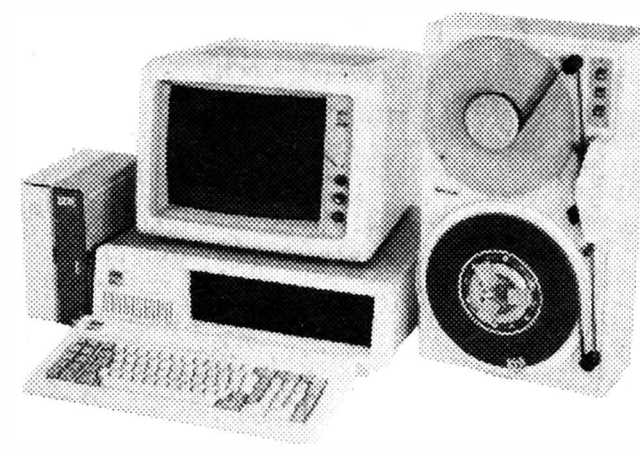
LASERVIEW DISPLAY SYSTEM, comprised of a high-resolution adapter board and a choice of either a 15- or 19-inch monochrome monitor, provides a resolution of 1,664 dots by 1,200 lines. *Sigma Designs, Inc., 46501 Landing Parkway, Fremont, CA 94538; (415) 770-0100; \$2,395 (including 19-inch monitor), \$1,895 (including 15-inch monitor), or \$1,150 for the Display Adapter only; retail. (For additional product details, circle 128 on one of the Free Information Cards.)*

MAYNSTREAM PLUS 20/20 is a portable combination half-height 20Mb tape backup unit and half-height 20Mb hard disk drive. A 20Mb file-by-file backup takes five minutes. The hard disk has an average seek time of 60 milliseconds. The Maynstream Plus runs on its own power supply. *Maynard Electronics, 460 E. Semoran Blvd., Casselberry, FL 32707; (305) 331-6402; \$2,400, PC and XT versions; \$2,200, AT version; retail or direct order. (For additional product details, circle 129 on one of the Free Information Cards.)*

MICROFAZER VI is a six-port printer-sharing device that has the capacity to store often-used printing formats in memory. It can be configured to enable any combination of computers, printers, plotters, and modems to work together (for example, four comput-

For more product information, please circle the appropriate number on one of the Free Information Cards that are located facing the Product Index within the product review section or opposite the Advertiser's Index.

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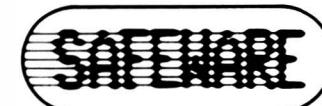
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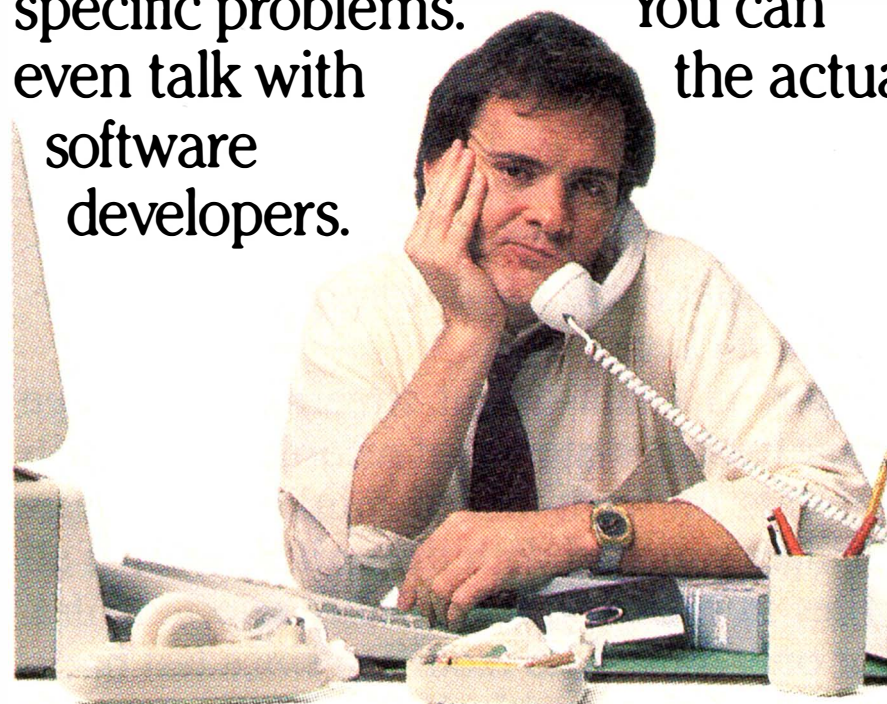
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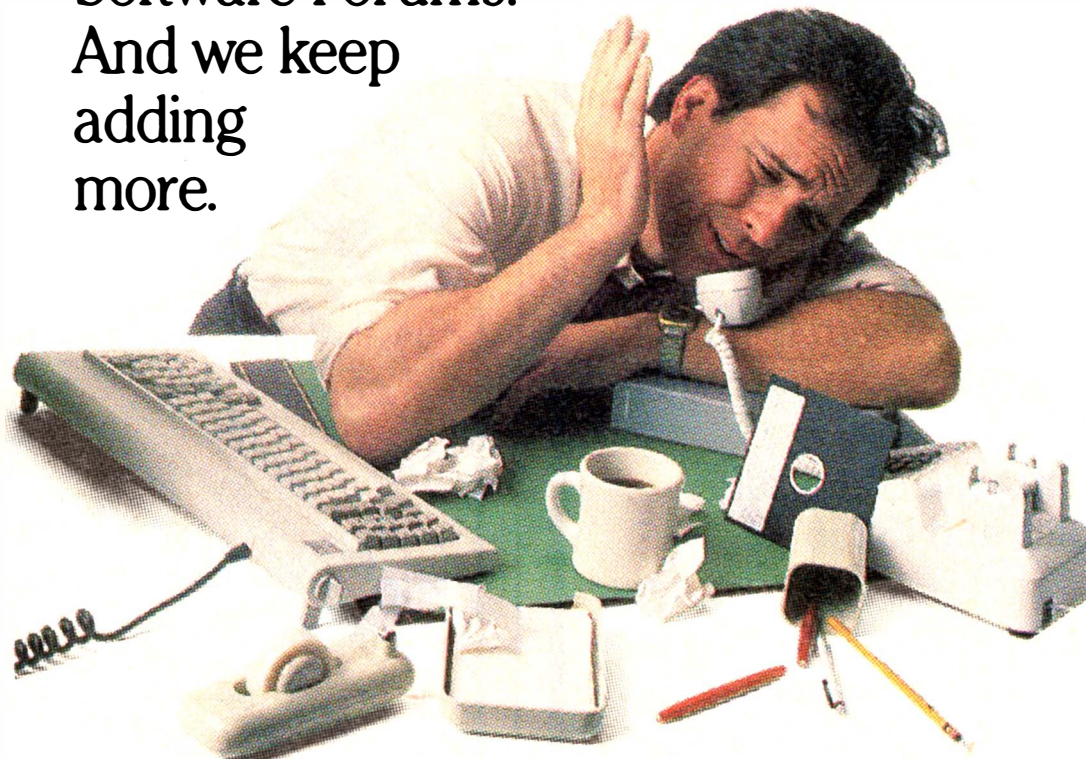
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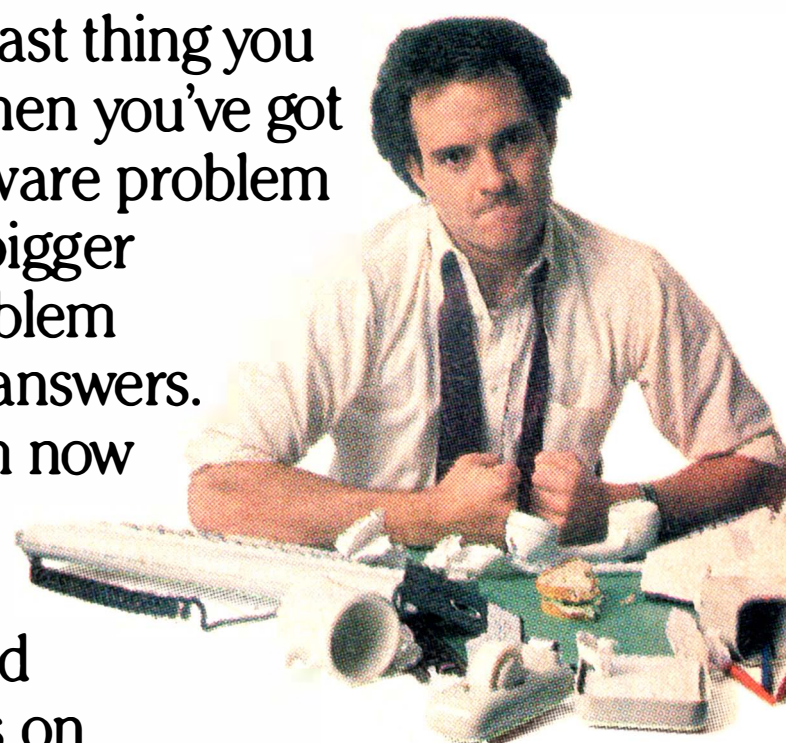
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(For More Information Circle 100)

PRODUCT LISTINGS

ers with two printers). *Quadram Corp., One Quad Way, Norcross, GA 30093-2919; (404) 923-6666; \$995 retail. (For additional product details, circle 130 on one of the Free Information Cards.)*

MODEL 8CM540 is an EGA monitor using a 14-inch 0.31mm-dot-pitch CRT to produce a resolution of 720 dots by as many as 350 lines. The 64-color display has a non-glare CRT, and green and amber text mode capability. *Magnavox, NAP Consumer Electronics Corp., Interstate 40 and Straw Plains Pike, PO Box 14810, Knoxville, TN 37914-1810; \$750 retail. (For additional product details, circle 131 on one of the Free Information Cards.)*

MOTHECARD version 5.0, an 80286 board for an IBM PC, XT or compatible, comes with 640k of DOS memory, 320k of EMS memory, a real-time clock, and a socket for an 80287 math coprocessor. To install the unit, the user can move the 8088 from the computer's motherboard to the Mothercard and insert the card into an open slot. The Mothercard is designed to provide full AT compatibility. *Sota Technology, Inc., 657 N. Pastoria Blvd., Sunnyvale, CA 94086; (408) 245-3366; \$995 retail. (For additional product details, circle 132 on one of the Free Information Cards.)*

NB24-15 is a 24-wire dot matrix printer with a draft speed of 180 characters per second and letter quality speed of 60 cps. It emu-

lates the Epson LQ-1000 printer, the IBM Graphics Printer, and the IBM Proprinter. (Qume Sprint 11, Diablo 630 and Toshiba P351 emulations are optional.) A parallel interface is standard, and a touch-pad control panel provides selection of 19 commonly used print and format functions. It also comes with a 15-inch carriage and a built-in font. Other plug-in fonts are optional. *Star Micronics, Inc., 200 Park Ave., Suite 3510, New York, NY; (212) 986-6770; \$1,099 retail. (For additional product details, circle 133 on one of the Free Information Cards.)*

NR-15 9-wire printer prints at 240 characters per second in draft and 60 in NLQ mode. Standard features include Epson FX-85, IBM Graphics Printer, and IBM Proprinter emulations, a parallel interface, a 16k buffer, friction and rear tractor feeds, and a 15-inch carriage. *Star Micronics, Inc., 200 Park Ave., Suite 3510, New York, NY 10166; (212) 986-6770; \$799 retail. (For additional product details, circle 134 on one of the Free Information Cards.)*

OSIBAK is a half-height streaming cartridge tape backup system that records up to 40Mb of data on front-loaded minidata tape cartridges supplied with the unit. It records all files in memory, specifically selected files, or only those files modified since last backup. Backup speed is 2Mb of data per minute. *Osicom Technologies, 198 Green Pond Road, Rockaway Township, NJ 07866; (201)*

586-2550; \$473, XT version; \$502, AT version; retail. (For additional product details, circle 135 on one of the Free Information Cards.)

OSICARD is a 3.5-inch hard disk on a card in 20- and 30Mb configurations that fits in the short slot nearest the fan for maximum cooling. It has an access time of 65 milliseconds. *Osicom Technologies, 198 Green Pond Road, Rockaway Township, NJ 07866; (201) 586-2550; \$484, 20Mb; \$526, 30Mb; retail. (For additional product details, circle 136 on one of the Free Information Cards.)*

OVERDRIVE 40 is a 40Mb internal SCSI hard disk drive for the Macintosh. It has an access time of 29 milliseconds; four software utilities are included. *Levco, 6160 Lusk Blvd., Suite C-203, San Diego, CA 91212; (619) 457-2011; \$2,699 retail. (For additional product details, circle 137 on one of the Free Information Cards.)*

QC-PGA is a professional graphics adapter that enables you to draw schematics, diagrams, and designs in high-resolution color, in addition to two- and three-dimensional images. Features include modeling, viewing transformations, command lists, color manipulation, and programmable text fonts. It can emulate MGA, HGA, and CGA, and comes with PGA-mode utility software. The adapter has a 16-bit 80286 microprocessor and uses 512k of RAM. It will simultaneously display 256 colors from a palette of

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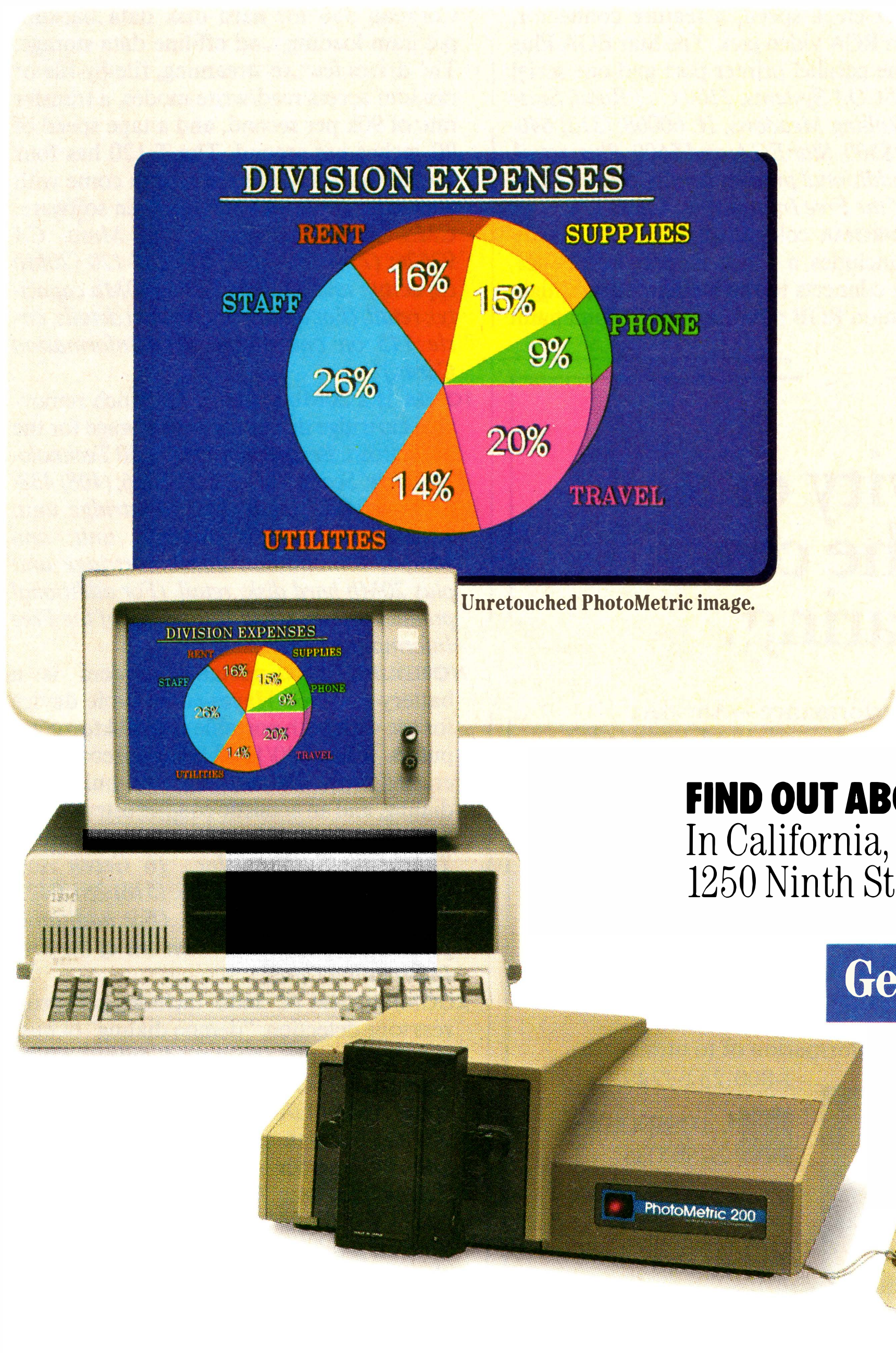
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PRODUCT LISTINGS

4,096 colors. *QIC Research, Inc.*, 753-755 Ames Ave., Milpitas, CA 95035; (408) 942-8086; \$995 retail. (For additional product details, circle 138 on one of the Free Information Cards.)

6408 is an eight-page-per-minute laser printer that can print bar codes, and includes 14 resident fonts. It has a 250-page input tray and 250-page collated output. The 6408 has a 300-by-300-dots-per-inch matrix print-head, and can handle portrait, landscape, and condensed printing. *Decision Data Computer Corp.*, 400 Horsham Road, Horsham, PA 19044-0996; (215) 674-3300; \$5,495 retail. (For additional product details, circle 139 on one of the Free Information Cards.)

SL-80AI 24-pin printer emulates the Epson LQ-1500 and IBM Graphics Printers, and has a draft speed of 135 characters per second and a letter quality speed of 45 cps. Features include friction/adjustable tractor feed, front panel left/right margin setting, automatic single-sheet loading, and a 10-inch carriage. *Hattori Seiko Computer Peripherals*, 1111 MacArthur Blvd., Mahwah, NJ 07430; (201) 529-4655; \$549 retail. (For additional product details, circle 140 on one of the Free Information Cards.)

SMART EGA is a half-size enhanced graphics adapter board compatible with EGA, CGA, and MDA, as well as the HGC (Hercules Graphics Controller) display mode, that provides a resolution of 750 by 350 pixels.

The Smart EGA is designed to work in any mode with any standard enhanced color display. With the "mode save" feature, users select the display mode through keyboard commands. The "palette save" feature enables users to specify the colors of text and graphics applications from a 64-color palette to keep chosen colors active even after a warm reboot of the computer. *NSI Logic, Inc.*, Cedar Hill Business Park, 257-B Cedar Hill Road, Marlboro, MA 01752; (617) 460-0717; \$549 retail. (For additional product details, circle 141 on one of the Free Information Cards.)

STAR EGA and **STAR EGA PLUS** are enhanced graphics adapters compatible with EGA, CGA, MDA, and HGA, displaying 640-by-350-pixel resolution in 16 colors from a palette of 64. They include 256k on-board DRAM for screen buffering, flicker-free panning and scrolling, selectable 4.77/6/8/10MHz clock speed, a feature connector, and an RCA video jack. The Star EGA Plus has one parallel printer port and one serial port. *SCOA Systems*, 2100 Golf Road, Suite 100, Rolling Meadows, IL 60008; (312) 640-8798; \$500, Star EGA; and \$600, Plus; retail. (For additional product details, circle 142 on one of the Free Information Cards.)

SUPERCHROMA color display for the Macintosh includes a video display controller, which connects to the modem port, a high-resolution RGB monitor, and Chromapaint

software. It has a 68000 processor and display coprocessor, one million pixels of available display memory, 640 by 480 pixel resolution, and 256 simultaneous colors from a palette of 262,144. *Computer Friends*, 14250 NW Science Park Drive, Portland, OR 97229; (503) 626-2291; \$2,995 retail. (For additional product details, circle 143 on one of the Free Information Cards.)

2400VP modem operates at 2400, 1200, or 300 bits per second synchronously or asynchronously. It provides MNP error control, speed conversion, an automatic voice-to-data switching circuit, front panel control, and non-volatile memory. *Racal-Vadic*, 1525 McCarthy Blvd., Milpitas, CA 95035; (408) 946-2227; \$595 retail. (For additional product details, circle 144 on one of the Free Information Cards.)

T-120 and **T-160** are add-on tape drives compatible with the IBM PC XT 286 and the Compaq 386 for hard disk data backup, program loading, and off-line data storage. The drives feature streaming, file-by-file or random access read/write modes, a transfer rate of 90k per second, and a tape speed of 90 inches per second. The T-120 has four tracks, the T-160 has nine. Both come with controller cards and menu-driven software. *CMS*, 3080-A Airway, Costa Mesa, CA 92626; (714) 549-9111; \$995, T-120 (20Mb capacity); and \$1,595, T-160 (60Mb capacity); retail. (For additional product details, circle 145 on one of the Free Information Cards.)

TOTEM is a 20Mb series of 5.25-inch removable cartridge drives for data storage for the Macintosh. *Bering Industries*, 250 Technology Circle, Scotts Valley, CA 95066; (408) 438-8779; \$1,495, single 20Mb cartridge unit; \$2,295, dual 20Mb cartridge unit; and \$2,295, combination 20Mb cartridge unit plus 20Mb hard disk; retail. (For additional product details, circle 146 on one of the Free Information Cards.)

WORLDLINK 1200 portable modem is a battery-powered Hayes-compatible device for use with both portable and desktop computers. It has 300/1200-bits-per-second operation, auto dial/auto answer, pulse/tone dialing, and an acoustic coupler interface for 300- and 1200-bits-per-second operation. *Touchbase Systems, Inc.*, 16 Green Acre Lane, Northport, NY 11768; (516) 261-0423; \$199 retail or direct order. (For additional product details, circle 147 on one of the Free Information Cards.)

ZOOM/MODEM PC 2400 includes call progress tone detection, "demon dialing" of busy numbers, audio input and output ports, support for four COM ports, and a high-speed 16450 UART for compatibility with AT compatibles. It supports 2400-, 1200-, and 300-bits-per-second standards. *Zoom Telephonics, Inc.*, 207 South St., Boston, MA 02111; (617) 423-1072; \$499 retail. (For additional product details, circle 148 on one of the Free Information Cards.)

ZVM-1380 is a 13-inch color monitor with EGA compatibility. When combined with an EGA card, the monitor is capable of displaying up to 64 colors (16 at a time) and a resolution of 640 horizontal dots by 350 ver-

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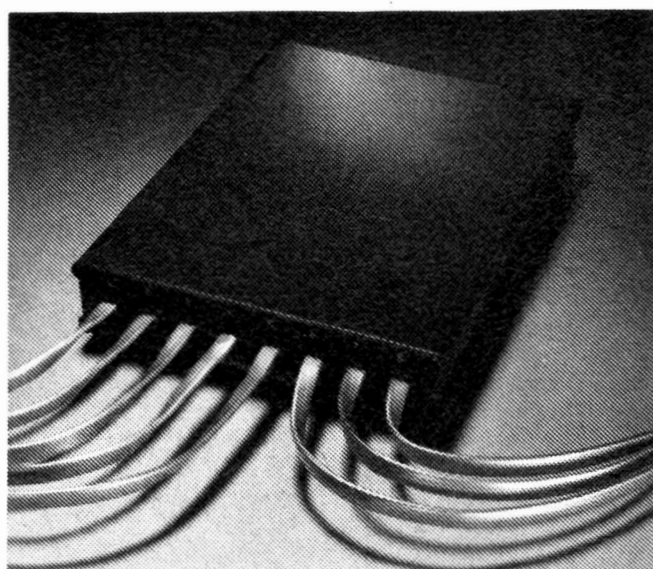
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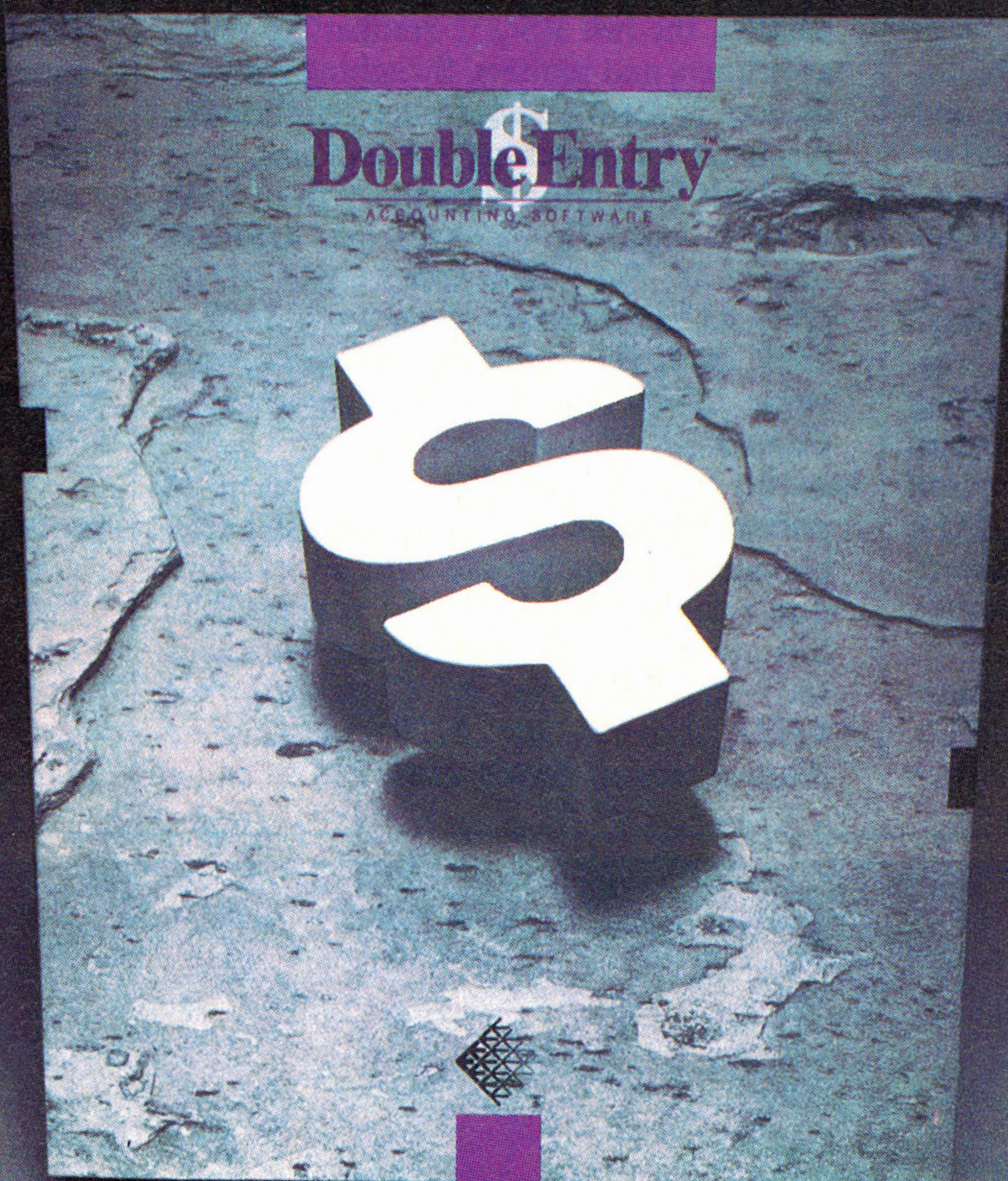
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Customer ID: _____ Customer Add: _____

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Code	Account on Posting Table
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5	Account: 5404 Dept: 50

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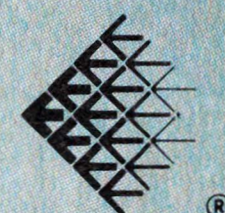
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PRODUCT LISTINGS

tical lines. In EGA mode, it displays an 8-by-14-dot character cell with a .31 millimeter dot pitch. With a CGA card, it displays 640-by-200 resolution with an 8-by-8-dot character cell. It features a non-glare screen and a text color control that provides a choice of white, green, or amber text. *Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; (312) 391-8860; \$799 retail. (For additional product details, circle 149 on one of the Free Information Cards.)*

MISCELLANEOUS

DOT MATRIX CLEANING KIT eliminates build-up of ink, dust, lint, and machine-generated debris on the print heads of printers, and reduces static electrical charges. Each kit contains a 1-ounce printer/plotter/typewriter cleaning agent; print element cleaning material; one 4-ounce spray can of "Air Clear" for cleaning rollers, tractors, and ribbon assemblies; and six office equipment cleaning pads and ink cleaning pads to clean equipment exteriors. *Networx, 203 Harrison Place, Brooklyn, NY 11237; (718) 821-7555; \$29.95 retail. (For additional product details, circle 150 on one of the Free Information Cards.)*

EC15 is a surge-protected personal computer table with an adjustable top shelf and adjustable work surface. An on/off switch

under the 36-inch-wide by 24-inch-deep work surface controls all the components plugged into the EC15's four grounded outlets. All four outlets have interference suppression and are surge protected, and the entire electrical assembly is protected with a 10-amp circuit breaker. *Bretford Manufacturing, Inc., 9715 Soreng Ave., Schiller Park, IL 60176; (312) 678-2545; \$292 retail. (For additional product details, circle 226 on one of the Free Information Cards.)*

THE JUGGLER is a print/plot buffer that will queue RS-232 output from one to four computers to two to five output devices—one parallel, the rest RS-232 compatible—such as printers and plotters. Switching between devices is software controlled, eliminating the need for switching mechanisms. It is available with internal memory from 256k to 768k. *Jewell Technologies, Inc., 4302 SW Alaska St., Suite 207, Seattle, WA 98116; (206) 937-1081; prices range from \$649 to \$899, retail. (For additional product details, circle 227 on one of the Free Information Cards.)*

MA-100 MODEM ADAPTER enables users of portable laptops to use non-modular telephones. It is compatible with all standard direct-connect modems and enables 300-bits-per-second communication. *Novation, Inc., 20409 Prairie St., Chatsworth, CA 91311; (213) 996-5060; \$129 retail. (For additional product details, circle 228 on one of*

the Free Information Cards.)

SCOOTER MODEL SP500M is a monitor stand with electrical power protection built into the base. It has locking tilt and full-swivel capabilities, and is designed for use with any monitor or an Apple Macintosh. Five protected and switchable sockets are provided to enable an interface to other peripheral equipment. *Scooter Products, Ohm/Electronics, Inc., 746 Vermont St., Palatine, IL 60067; (800) 323-2727; \$79.95 retail. (For additional product details, circle 229 on one of the Free Information Cards.)*

TURBO MOUSE is a trackball for the Apple IIe, IIc, and Macintosh. The device, in essence a mouse turned upside down, is 40 percent faster than a standard mouse, according to the manufacturer. *Kensington Microware, Ltd., 251 Park Ave. South, New York, NY 10010; (212) 475-5200; \$129.95 retail. (For additional product details, circle 230 on one of the Free Information Cards.)*

PRODUCTIVITY

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MACH IV	Apple IIE/IIC	\$ 89.95
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MACH IV	Macintosh (works as a mouse only)	\$ 89.95
MACH IV	for IBM PC/XT/AT and compatibles	\$119.95
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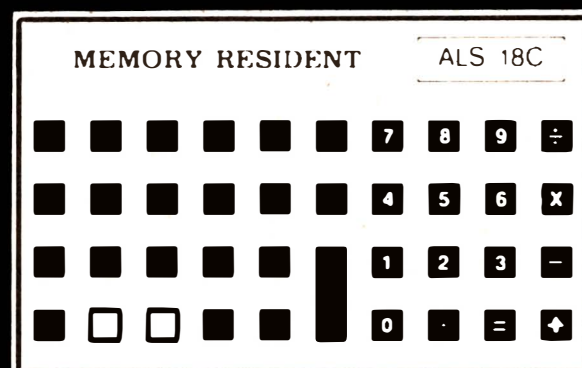
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PRODUCT LISTINGS

following industries: computers, oil and gas, brewing, automotive, and pharmaceutical. The memory requirement is 384k. *Reality Technologies, 3624 Market St., Philadelphia, PA 19104; (800) 346-2024; \$249.95 retail. (For additional product details, circle 235 on one of the Free Information Cards.)*

CASH DRAWER is a point-of-sale accounting package. The package is designed to handle the needs of a retail business, including sales, rentals, and services, such as time/billing or repairs. According to the manufacturer, the program has all the speed, data file size, and compatibility advantages inherent in a compiled dBase III program. Standard and advanced reports are programmed in. In addition, a full-feature custom report generator is provided. DBase III can be used to generate custom reports or analyses. Features of the program include four levels of password security, and bar menus. The memory requirement is 384k. *Computer Product Introductions Corp., 2127 Bellevue Way SE, Bellevue, WA 98004; (206) 451-9788; \$1,295 retail. (For additional product details, circle 236 on one of the Free Information Cards.)*

CONTACT is a client/contact list management data base featuring prompts and nested menus that can be invoked with single-key commands. Features of the program include the ability to: classify contacts by 22 menu-supplied type categories; create and print custom letters or memos; print labels for contacts by type and in zip code order; and track client/contact addresses, phone numbers, products, or services. All items can be retrieved, added to, edited, or deleted. The memory requirement is 320k; a hard disk is recommended. *Frontline Publications, PO Box 1104, El Toro, CA 92630; (714) 837-6258; \$69 retail. (For additional product details, circle 237 on one of the Free Information Cards.)*

dANALYST version 6.0, a programming utility, is designed to convert single-user dBase III programs to multiuser dBase III Plus programs. The program supports multiuser networks including Clipper, dBase III Plus, FoxBase, and the network version of the WordTech compiler. Features of the program include: Backup Tree of PRG, an option used to create batch programs that copy source programs from a subdirectory; Backup Tree of DBF, used to isolate and back up all the data files, referenced by application; Hierarchial Chart, lists in hierarchial format for all modules of an application; high bit strip, which removes the high bit from the ASCII character codes within a file; Module VAR CrossRef, which produces a table of all the variables for a particular module; and printer modes, in which the printer control codes can be dialed for compressed print on nonstandard printers. The memory requirement is 70k with color graphics, 50k with monochrome; retail. *Transec Systems, Inc., 220 Congress Park Drive, Suite 200, Delray Beach, FL 33445; (305) 276-1500; \$74.95 retail. (For additional product details, circle 238 on one of the Free Information Cards.)*

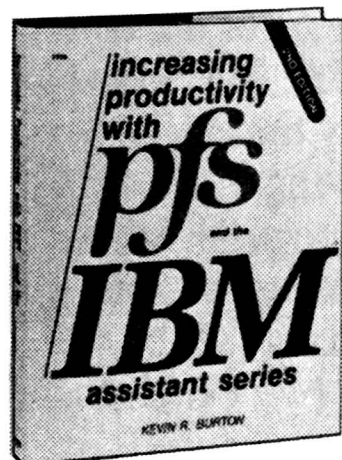
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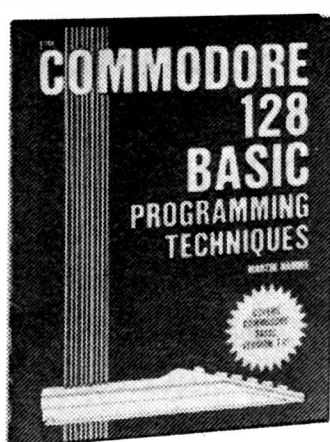
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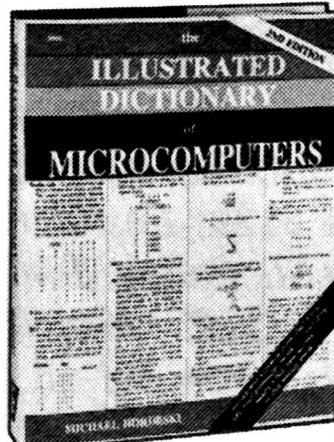
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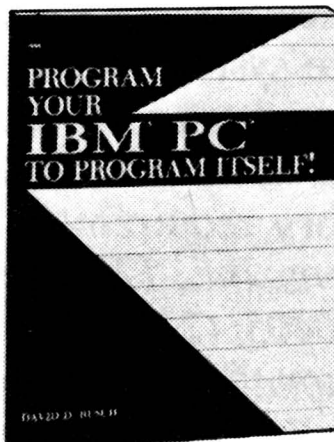
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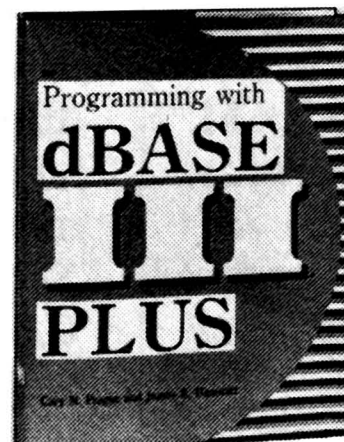
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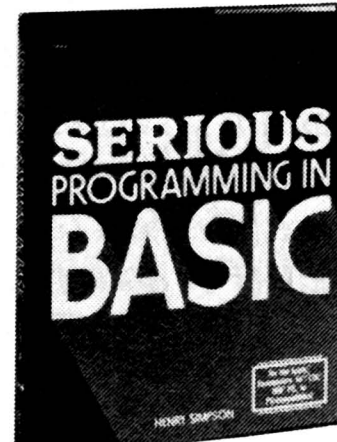
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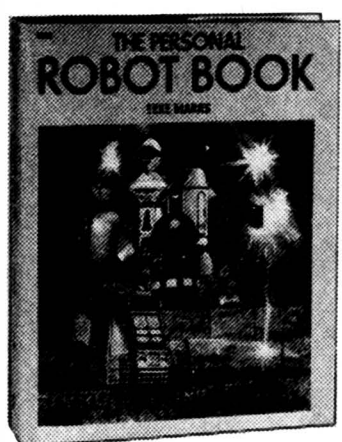
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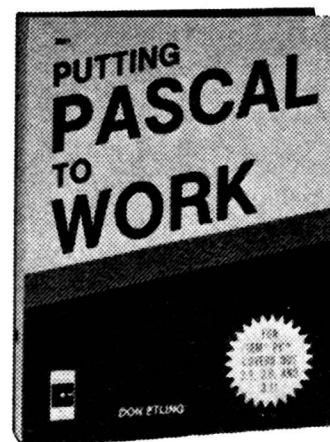
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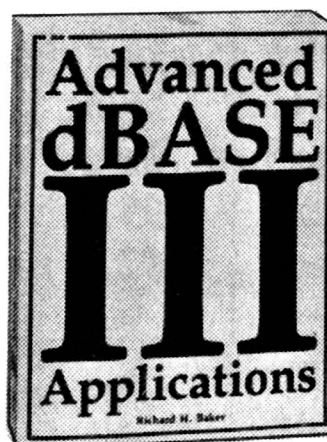
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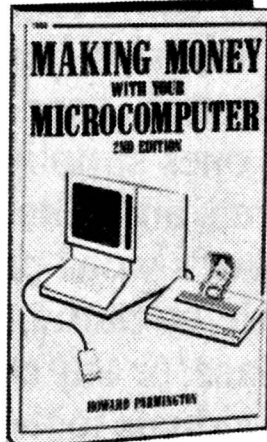
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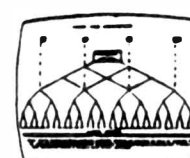
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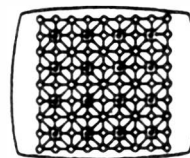


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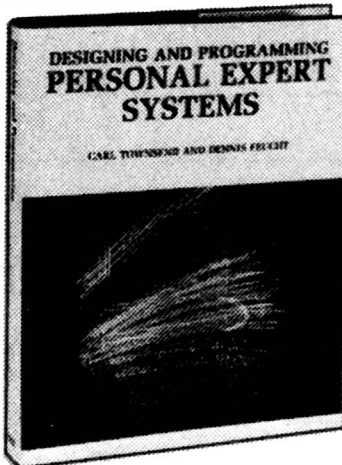
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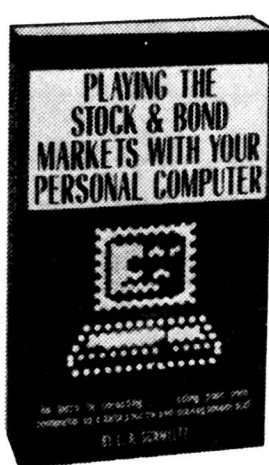
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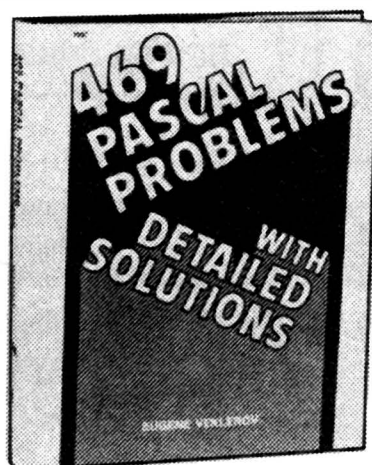
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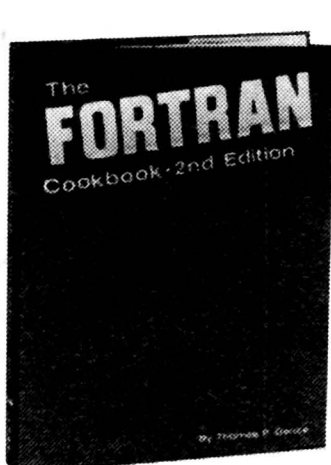
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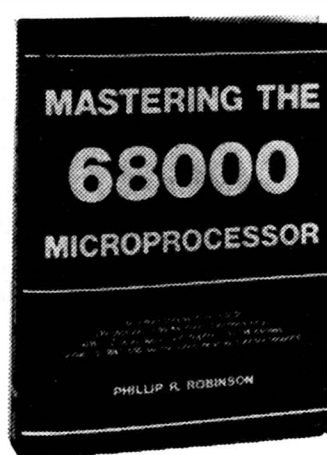
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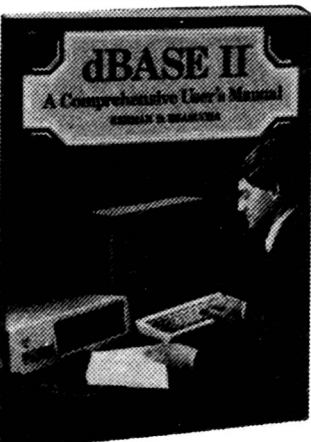


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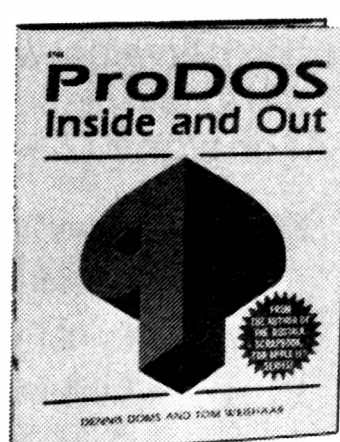


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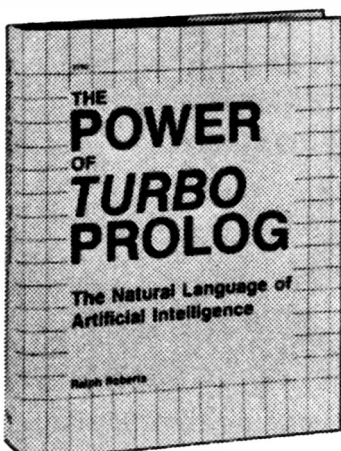
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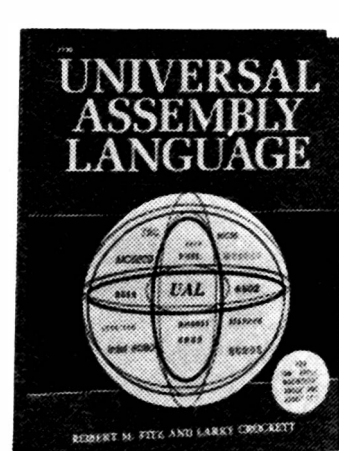
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DBARCODE is a bar code printing program designed to print bar codes with descriptions, or multiple columns of bar codes across a page. According to the manufacturer, the package permits adjustment of bar and space widths to suit various bar code readers. It also provides for variable bar code height and vertical spacing. The memory requirement is 8k; an IBM Graphics-compatible printer is also required. *TimeKeeping Systems, Inc., 12434 Cedar Road, Cleveland, OH 44106; (216) 229-2579; \$99 retail. (For additional product details, circle 240 on one of the Free Information Cards.)*

DCOMM->LINK is a communications pro-

gram for dBase III Plus. The package is designed to expand the capabilities of dBase III Plus and other data base management programs such as Quicksilver, Foxbase Plus, and Clipper. According to the manufacturer, it enables external devices, remote systems, and outside dial-up computer services to exchange data directly to any data base that uses the Ashton-Tate standard for storage and management. Devices include bar code readers, cash registers, and computer service systems. The program enables any dBase system to accept incoming calls and handle data transfers automatically. The memory requirement is 512k. *FastComm Systems, Inc., 1704 22nd St., Santa Monica, CA 90405; (213) 828-9551; \$295 retail. (For additional product details, circle 241 on one of the Free Information Cards.)*

FAMILY ROOTS version 3, is a genealogical research program designed for use in large surname projects and family histories. Features of the new version include: nine user fields that can be added to the ones supplied for multiple marriages, children, and notes; text may be added with the user's word processor; searches may be made by name, alternate spellings, number, place, or any combination; users can add individuals to the data base in any order and the program will place them into family groups automatically. The memory requirement is 256k. *Quinsept, Inc., PO Box 216, Lexington, MA 02173*

(617) 641-2930; \$185 retail. (For additional product details, circle 242 on one of the Free Information Cards.)

FLOW CHARTING II+ is a flowcharting program with features including text fonts, line insert mode, and full DOS path support. Eight new text fonts have been added to the previous version of the program, for a total of 10 fonts, including high, wide, title, fat, Greek, and super/subscripts. The user can select free entry or auto-centering of the text from within the text mode. The line insert mode gives the F2 function key the ability to turn the cursor into a drawing tool that draws lines of four widths: normal, bold, hollow, and dashed. Users can design charts for the three standard paper sizes (8.5 by 11 inches, 8.5 by 14 inches, or 14 by 11 inches), and print sideways or normal, using draft or presentation quality print styles. With full DOS support, the computer will do the loading and printing. The memory requirement is 192k. *Patton & Patton Software Corp., 81 Great Oaks Blvd., San Jose, CA 95119; (408) 629-5376 or (408) 629-5044; \$229 retail or direct order. (For additional*

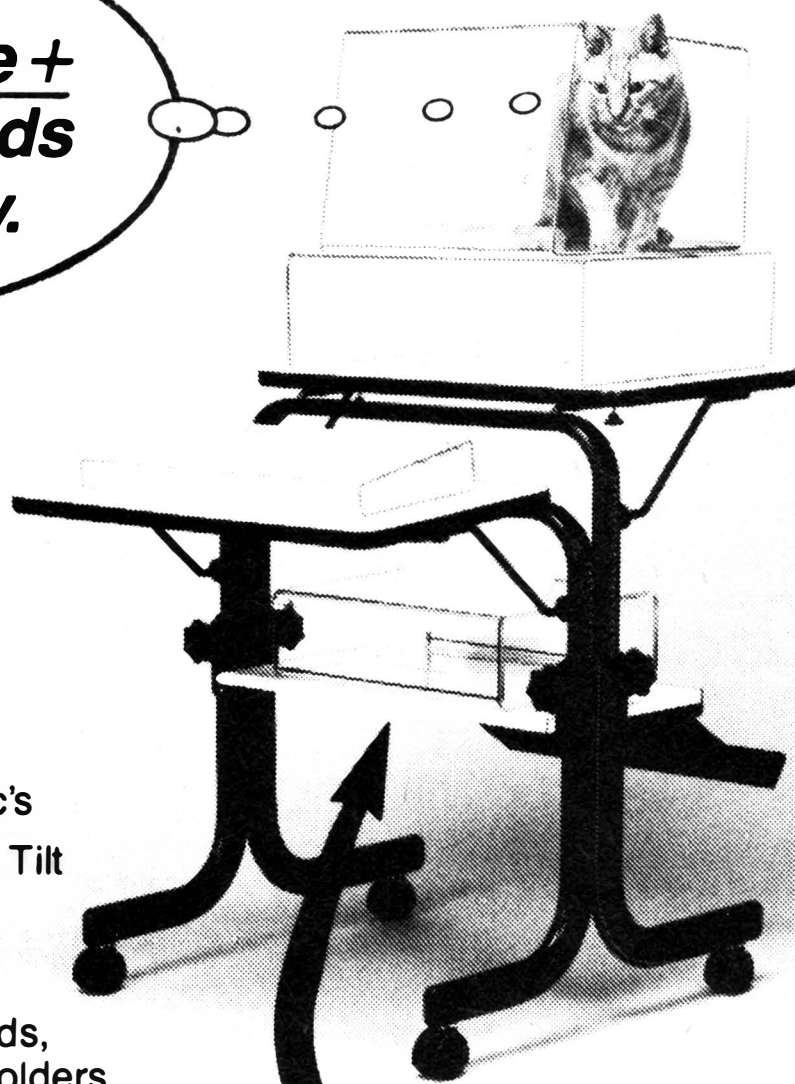
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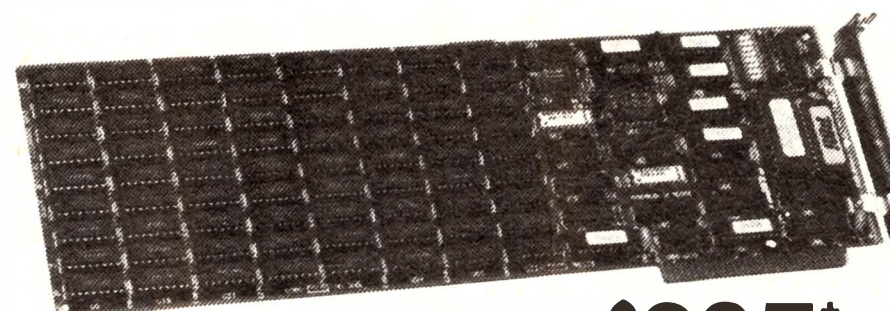
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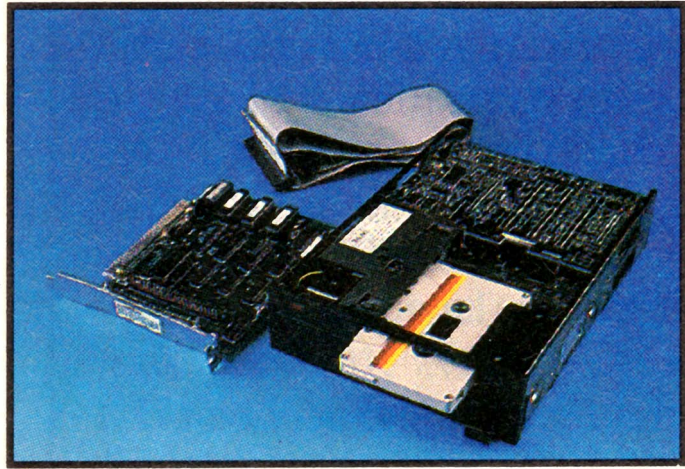
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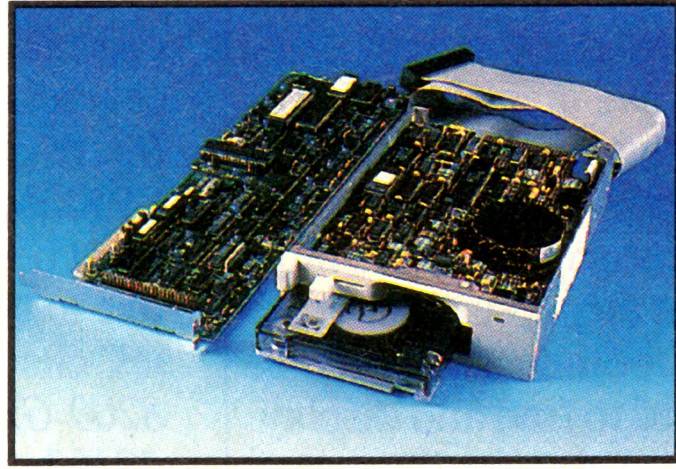
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Mass Storage

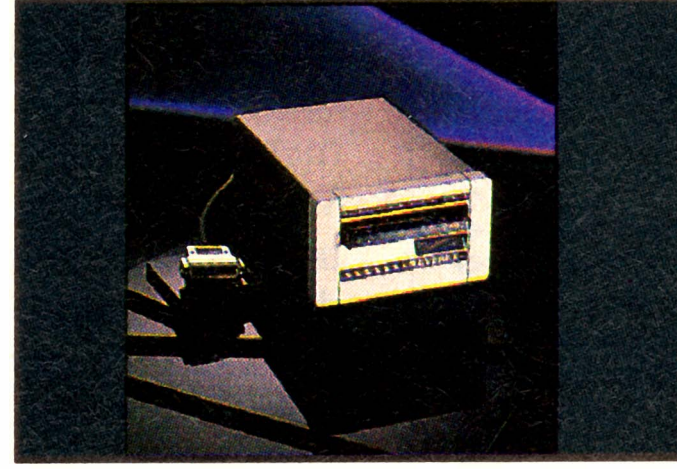
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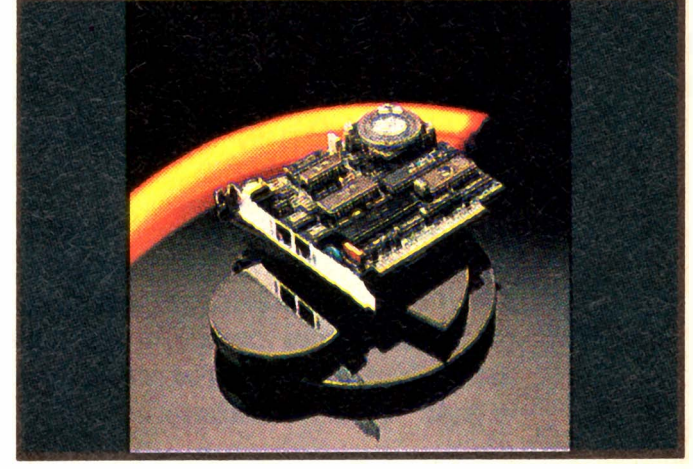
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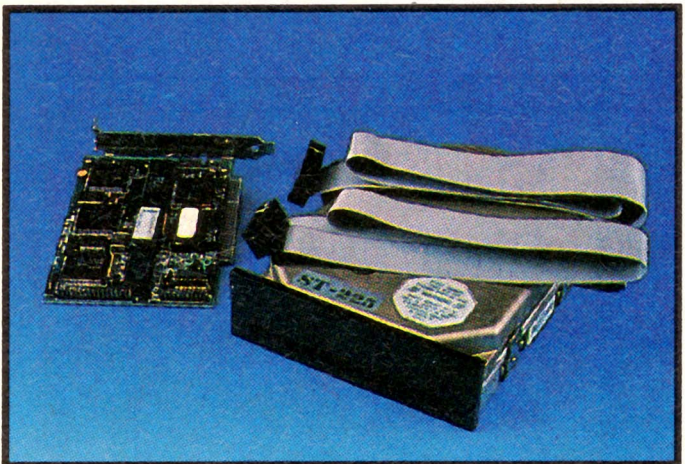
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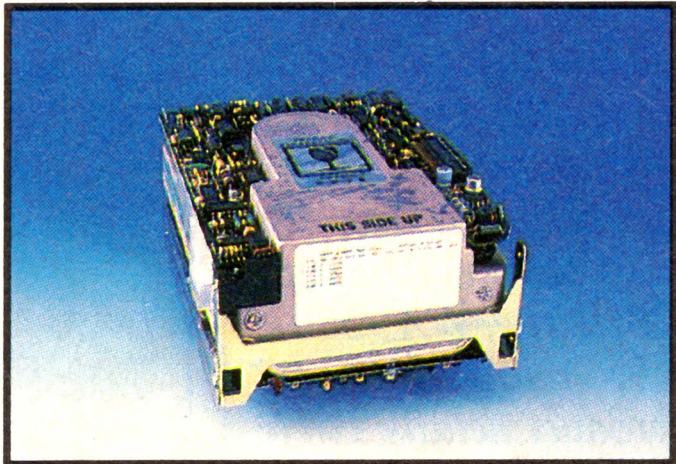
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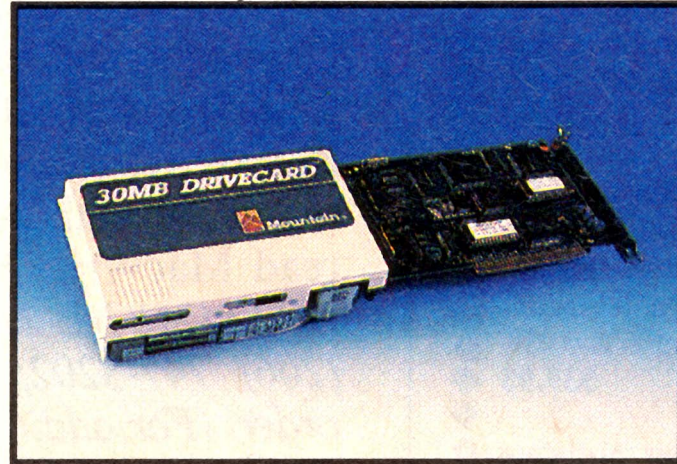
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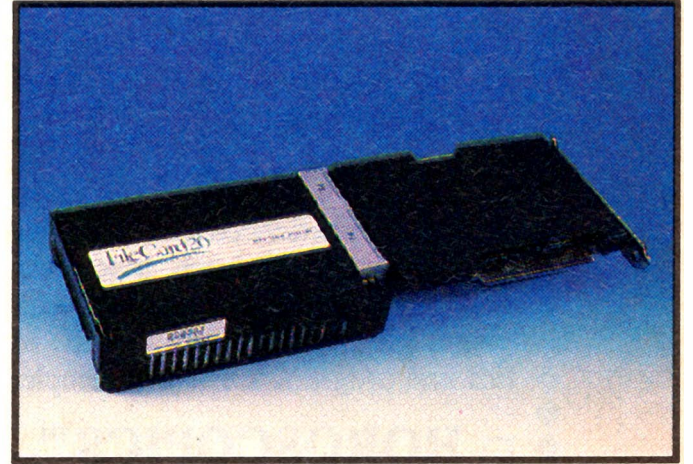
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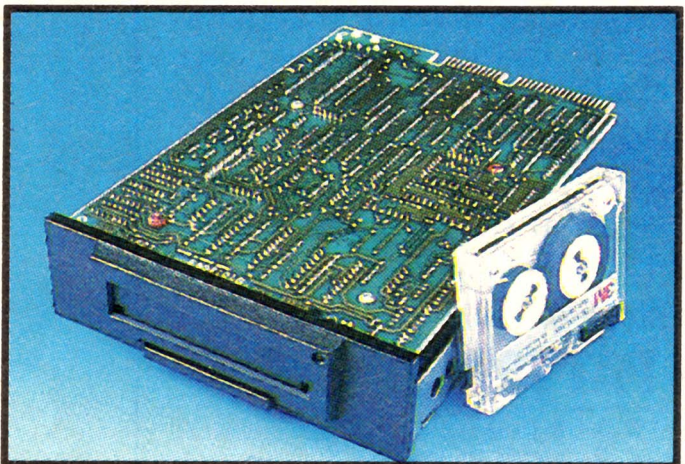
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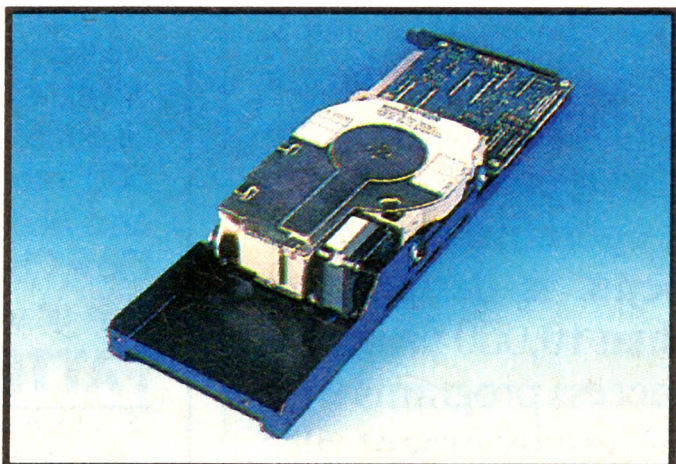
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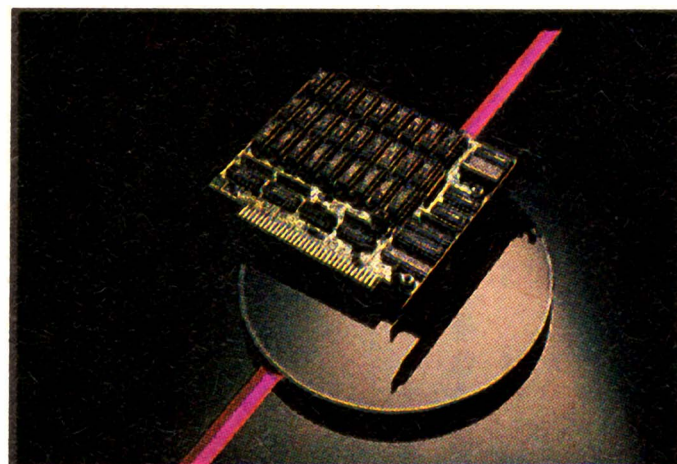
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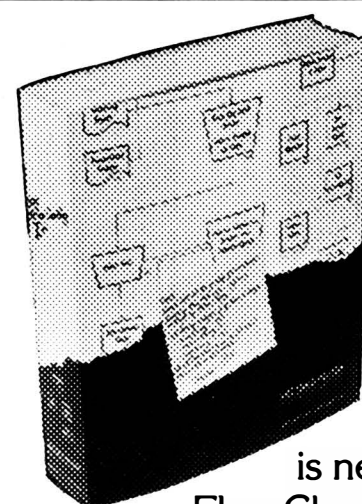
GUIDE, for the Macintosh, is a personal hypertext system designed to incorporate many of the features of word processors and outline processors as well as additional abilities for information management, such as cross-referencing and annotation. According to the manufacturer, the program enables the user to create live areas in a document that can be activated by a mouse. When clicked on, these live areas can open up new areas of the document that were hidden. They can also open up pop-up windows for notes, comments, footnotes, or definitions, or they can be used to find and display cross-referenced information in the same document or in another document. Guide also works with text and graphics, giving it desktop publishing capabilities. The program requires a 512k Macintosh, a Mac Plus, or a Macintosh XL. It can work with any graphics program that supports the Clipboard, and has an option to save files in MacWrite format so that it can be used with MacWrite, Microsoft Word, Aldus' PageMaker, or with any other program that can read MacWrite files. *OWL International, Inc., 14218 NE 21st St., Bellevue, WA 98007; (206) 747-3202; \$134.95 retail or direct order. (For additional product details, circle 244 on one of the Free Information Cards.)*

HOMEBase version 2.5 is a report writer that includes a feature designed to produce reports that the manufacturer says are nearly identical to the reports generated by Traveling SideKick. A utility is included that converts SideKick files to HomeBase files. Newly added features include larger memory-resident files, a DOS operating environment, and expanded report writing capabilities. The DOS operating environment, called PowerMenu, is designed to enable access to more than 10,000 programs through menus, which access programs with a single keystroke. The environment also features a File Manager that displays directories and files, and provides direct menu-driven access to DOS commands. The memory requirement is 80k. *Brown Bag Software, The Software Resource Group, Inc., 2105 South Bascom Ave., Campbell, CA 95008; (408) 559-4545; \$89.95 retail. (For additional product details, circle 245 on one of the Free Information Cards.)*

INTERWORD is a multilingual word processing package designed to provide simplified production of multilingual documents. Features of the program include: switching between languages with one keystroke without changing disks; enhancement of documents with straight-line graphs; editing and printing text in 11 languages (Danish, English, French, Finnish, German, Icelandic, Italian, Norwegian, Portuguese, Spanish, and Swedish); writing/editing and printing of any combination of Italian, English, French, German, and Spanish; inserting words and letters of one language into another; cut-and-paste functions that define text for repositioning in a document segment or file; formatting text in multiple vertically justified or ragged-right columns or dividing it

horizontally in a desired screen width; creating simple and shaded bar charts and line graphs, horizontal and vertical rules and dividers, linear frames, and outlines for columns, sections, and blocks of copy; and creating organizational tables based on lines and rectangles. The memory requirement is 128k; also required is a color or monochrome monitor driven by a board having a character generator compatible with one of Interword's character generators. An EPROM computer chip that is provided must be installed on the IBM PC or compatible to use with specific language and graphics characters. *Computers Anyware, Inc., 8200 Greensboro Drive, #304, McLean, VA 22102; (703) 442-7910; \$495 retail. (For additional product details, circle 246 on one of the Free Information Cards.)*

MATH RABBIT, the school edition, is designed specifically for classroom use and includes a teacher's guide with lesson plans, blackline masters for student activities, a scope and



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sequence chart, and program and backup disks. The program is designed to introduce children in grades kindergarten through two to early math concepts: addition, subtraction, recognizing number relationships and patterns, and skills for future work in multiplication. The memory requirement is 256k. *The Learning Company, 545 Middlefield Road, Suite 170, Menlo Park, CA 94025; (415) 328-5410; \$39.95 retail. (For additional product details, circle 247 on one of the Free Information Cards.)*

MINDWRITE, for the Macintosh, is a word processor with an integrated outliner. The program is designed so that the user can turn outlining features on and off in any document, in any window or paragraph. Features of the program include: multiple selection of text segments; multiple windows; auto-numbering, automatic labeling; multilevel rulers to eliminate formatting steps; comprehensive searches through all or selected text; automatic time and date stamps; comprehensive preferences for specifying font, formatting, and viewing characteristics for new documents; and the ability to drag text. The package requires a 512k Macintosh and external disk drive. *MindWork Software, PO Box 222280, Carmel, CA 93922; (408) 625-2720; \$125 retail. (For additional product details, circle 248 on one of the Free Information Cards.)*

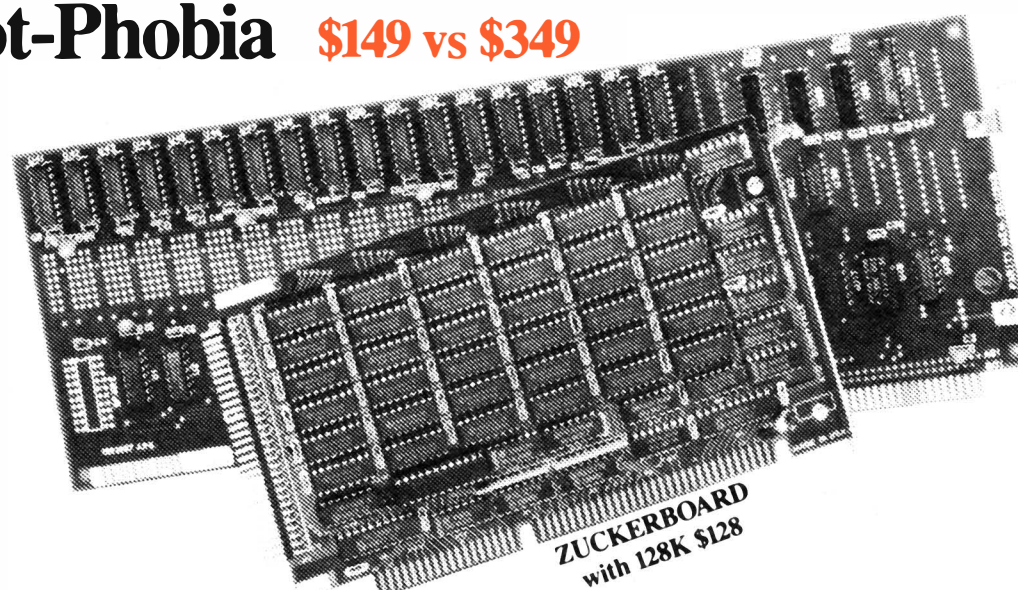
MVP SPREADSHEET PLUS is a spreadsheet featuring a backward solving capability. According to the manufacturer, MVP users are able to change the output values or calculated cells of a spreadsheet and work backward to see how variables would have to change to produce the desired result. This enables the user to perform what-if budget analysis. Other features of the program include: the ability to respond to English commands; an UNDO command; an integrated macro writing and editing tool; and the ability to have more than 30 categories of information on one spreadsheet at one time. The memory requirement is 640k, and a 1.5Mb hard disk is also required. *Bell Atlantic Corp., Network Services, Inc., 1310 N. Court House Road, Arlington, VA 22201; (703) 974-3000; \$400 retail. (For additional product details, circle 249 on one of the Free Information Cards.)*

THE OPEN ACCESS II DATABASE, with programming language, is a relational data base designed to give users unlimited file, screen, and reporting formats. According to the manufacturer, it can access and join eight files simultaneously; enabling file updates, calculation, input verification, and comparisons. The memory requirement is 256k. *Software Products International, 10240 Sorrento Valley Road, San Diego, CA 92121; (619) 450-1526; \$395 retail. (For additional product details, circle 250 on one of the Free Information Cards.)*

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PRODUCT LISTINGS

graphics, includes a goal-seeking feature. This feature is designed to free the user from doing what-if analyses. With Open Access, the user needs to establish one or more goals—the spreadsheet will then calculate the values needed to achieve the goals. The graphics included in the spreadsheet include 3D surface plots, scatter plots, financial high-low-close graphs, stacked line and bar graphs, and overlays. The on-screen graphics editing includes rotation. The memory requirement is 256k. *Software Products International, 10240 Sorrento Valley Road, San Diego, CA 92121; (619) 450-1526; \$295 retail. (For additional product details, circle 310 on one of the Free Information Cards.)*

PC MANAGER is a RAM-resident program with a Remind feature that initiates feedback on managerial performance and reminds the user of appointments, goals, and things to do while another program is running. The manufacturer says that in addition to a reminder appearing 15 minutes prior to appointments, random motivational messages track the user's managerial performance. Features of the program include: a Calendar screen that is arranged daily and monthly to trigger reminders; a Goal screen that defines goals; an Information/People screen that stores personal information; an Action/People screen that tracks productivity; a Notes screen that is an easy-to-use memo pad; a Feedback screen that compiles

weekly and monthly statistics on the number of items accomplished; and a calculator, calendar, and time tool available from any screen to assist in daily activities. The memory requirement is 192k. *Sterling Castle Software, 702 Washington St., Suite 174, Marina del Rey, CA 90292; (213) 306-3020 or (800) 722-7853; \$99 retail. (For additional product details, circle 311 on one of the Free Information Cards.)*

PC TRACKER version 4.0, an integrated management system, is designed to keep inventory for tracking personal computers, software, peripherals, and accessories through a data base that includes users, vendors, products, and inventory. The package enables managers to keep track of equipment and users. Features of the program include built-in reports in summary or detail form, ad hoc reports that use the query-by-example technique, and full export/import facilities. The memory requirement is 256k. *RG Software Systems, Inc., PO Box 426, Fort Washington, PA 19034; (215) 576-0970; \$495 retail. (For additional product details, circle 312 on one of the Free Information Cards.)*

PRISM, a risk analysis and simulation modeling program, is designed to use probabilities and simulation techniques to enable the modeling of uncertain or risky situations. According to the manufacturer, Prism enables users to develop, analyze, and maintain their own risk analysis models and generate

probability distributions of the possible outcomes that may be encountered. Models may include hundreds of equations and complex relationships. A single simulation can generate hundreds of output distributions. A wide variety of distribution types are available for entering data. The memory requirement is 512k, and a graphics adapter is also required. *Tempus Development Corp., 1941 N. Vermont St., Arlington, VA 22207; (703) 522-3780; \$895 retail. (For additional product details, circle 313 on one of the Free Information Cards.)*

READER-PC is a proofreading program that checks a document for duplicated words, missing capitalization, and misspelled words. The program checks the spelling of words in the document by matching them to words in the 39,000-word dictionary that is part of the system. The user can customize the system to include multiple auxiliary dictionaries that are specific to special subject areas, departments, or groups. The memory requirement is 128k. *Legist Automation, Inc., 2405 Garden Park Court, Suite C, Arlington, TX 76013; (817) 274-0089; \$189 retail. (For additional product details, circle 314 on one of the Free Information Cards.)*

REAL ESTATE INVESTMENT TEMPLATES are a series of worksheet templates for Lotus 1-2-3, VP Planner, or other spreadsheets capable of using 1-2-3 worksheet files. The series is designed to include a 10-year sensitivity

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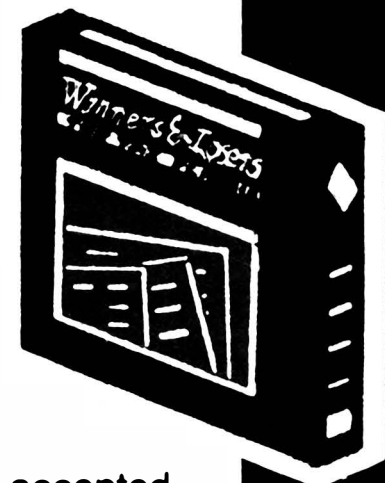
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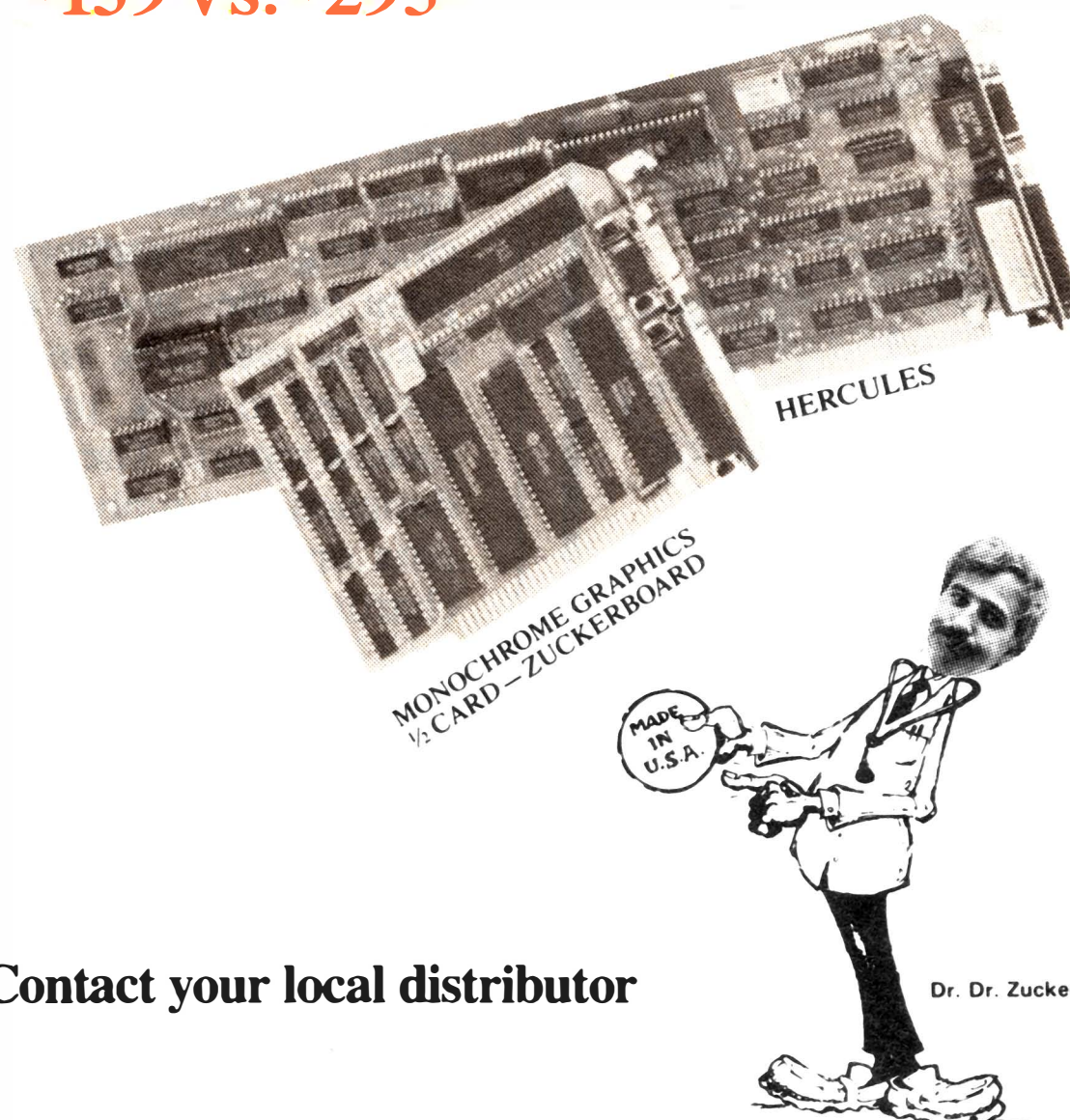
SPELLSWELL, version 1.3, the spell checking and proofreading program for the Macintosh, now scans documents created with Microsoft Works, Lotus' Jazz, and Living Videotext's More. Spellswell can also scan documents created with Apple's MacWrite, Microsoft Word, and Living Videotext's ThinkTank, as well as any text-only document. The new version includes a 93,000-word dictionary, and features expanded proofreading capabilities, enhanced speed, and keyboard shortcut option settings. The memory requirement is 368k. *Green, Johnson, Inc., 15 Via Chualar, Monterey, CA 93940; (408) 375-2828; \$74.95 retail or direct order. (For additional product details, circle 316 on one of the Free Information Cards.)*

PERFORMANCE

ACCOUNTANT'S CHOICE, a business accounting package for the Macintosh, includes System Manager, General Ledger, and Accounts Payable modules. The System Manager is a data base system that is designed to function as a report generator, a mass change editor, and a file builder so users can create custom data files. The General Ledger features a chart of accounts, financial statement formats, an unlimited number of accounts and budgets, financial statement printing, and prior postings to past months. Features of Accounts Payable include control over aging periods, debit memo processing, and check maintenance. All forms, such as checks, invoices, etc., are customized so they can be printed in any format. All the modules run under the System Manager, so it is possible to bring up more than one function at a time. The System Manager must be installed to run any of the program's modules. The memory requirement for each module is 512k; a hard disk is recommended. *Enchanted Software, Inc., PO Box 21507, Albuquerque, NM 87154; (800) 654-6795; \$99 (each module) direct order. (For additional product details, circle 319 on one of the Free Information Cards.)*

THE ACTIVE INVESTOR, an investment system, accesses a Wall Street financial data base maintained by the Interactive Data Corp. (IDC). According to the manufacturer, in

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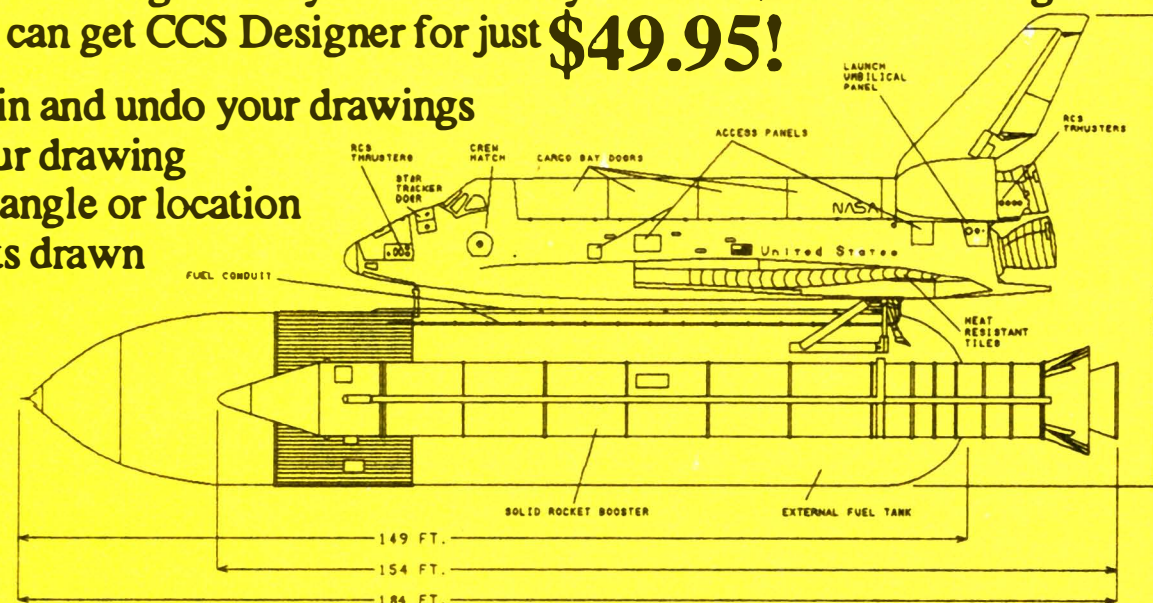
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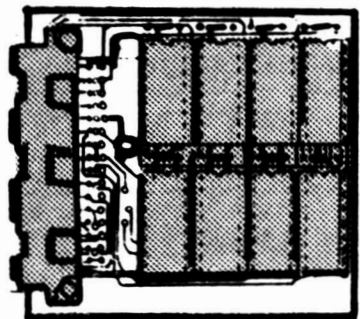
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PRODUCT LISTINGS

addition to IDC the user can get data directly from Value Line Investment Survey, which analyzes and rates more than 1,600 stocks and 92 industries. The system consists of three programs: portfolio management, fundamental analysis, and technical charting. The portfolio management program handles stocks, bonds, commodities, options, warrants, and mutual funds. It is designed to track, update, and generate financial reports. The fundamental analysis is designed to supply key items of financial data on a public company. The technical charting program offers 30 charting methods; it is designed to enable the user to pre-program specialized charting methods. The memory requirement is 256k. *The Jeffers Corp., 2570 San Ramon Valley Blvd., Suite A103, San Ramon, CA 94583; (800) 356-1122 or (800) 452-1122 (in Calif.); \$395 retail. (For additional product details, circle 320 on one of the Free Information Cards.)*

ALS 18C FINANCIAL CONSULTANT is a menu-driven financial calculator. The program calculates loan amortization, savings and annuities, metric conversion, percent calculations, break-even analysis, depreciation, internal rate of return, IRAs, discounted cash flow, investment analysis, buying vs. leasing, simple interest, statistics, leasing, real estate, and bonds. ALS 18C can run as a RAM-resident pop-up. It also includes a scientific calculator. The memory requirement is 50k. *Cloneware, Advanced Logic Systems, Inc., 1283 Reamwood Ave., Sunnyvale, CA 94089; (408) 747-1988; \$89.99 retail. (For additional product details, circle 321 on one of the Free Information Cards.)*

THE ENHANCED-SPEED AUTOSKETCH, a computer-aided design (CAD) package, has now been enhanced to work with an 8087 or an 80287 math coprocessor. Because the enhanced-speed version is a smaller program than the standard version, it provides more available memory, enabling more complex or larger drawings. The memory requirement is 512k. *Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965; (415) 331-0356; \$99.95 retail or direct order. (For additional product details, circle 322 on one of the Free Information Cards.)*

CAPTAIN'S LOG is a program designed to train the user in cognitive skills including attention, concentration, memory, visual/motor, and reasoning. Features of the program include "game-like" skill training, color graphics, three levels of play, an assessment mode and response score printouts, mouse menu and game control, and automatic dating and timing of sessions. The memory required is 128k; a Microsoft-compatible mouse, a hard disk, and a color monitor are also required. *Network Services, 1915 Huguenot Road, Richmond, VA 23235; (804) 379-2253; \$895 direct order. (For additional product details, circle 324 on one of the Free Information Cards.)*

DESKTALK is a menu-driven desk organizer and communications program with a RAM-resident calendar for daily, weekly, and monthly planning. Also included in the program is a memory-resident card file that is designed to enable the user to sort, cross-

index, and print information; and a phone dialer that automatically dials phone numbers and long-distance prefixes. The manufacturer says the 100 percent Hayes-compatible communications program that is included in Desktalk enables the user to send and receive information, automatically answer and dial the phone, and automatically send log-on strings. This part of the program is non-resident. The memory requirement is 70k; a Hayes or compatible modem is also required for the phone dialer and communications program. *Cloneware, Advanced Logic Systems, Inc., 1283 Reamwood Ave., Sunnyvale, CA 94089; (408) 747-1988; \$59.95 retail. (For additional product details, circle 325 on one of the Free Information Cards.)*

DISK EXPLORER is a file recovery system for accidentally erased or deleted files. According to the manufacturer, DOS directories may be displayed, and the status of files can be changed to prevent accidental erasure of a file or data being changed in any sector of the disk. Defective disks can be formatted so that DOS will not detect bad sectors. The memory requirement is 128k. *Quaid Software Limited, 45 Charles St. East, Third Floor, Toronto, Ontario, Canada, M4Y 1S2; (416) 961-8243; \$US75 (\$C105) retail. (For additional product details, circle 326 on one of the Free Information Cards.)*

FILENOTES is a memory-resident program that enables users to catalog and describe files, and recall file names as needed by scanning an on-screen index card directory. After the program is loaded into memory, it can be popped-up onto the screen. The memory requirement is 256k. *Practical Peripherals, 31245 La Baya Drive, Westlake Village, CA 91362; (818) 991-8200; \$39.95 retail or direct order. (For additional product details, circle 327 on one of the Free Information Cards.)*

INTERMAIL, for the Macintosh, is an electronic mail system designed to enable both local and remote networks to communicate and transfer files. Features of the program include multitasking server operation, multiple message type (including the Network Assistance Message), multiple zone support, comprehensive file transfer capabilities, on-line help, custom mailing lists, a receipt of message indicator, and mailbox password security. The program, which operates as a desk accessory, is available from within any application running at the time (provided that the program has been installed in the System file). In addition, users can read, print, or delete multiple messages at once. InterMail is designed to enable the user to send either standard, telephone, or network messages of up to 32,000 characters each. According to the manufacturer, the program notifies the user of the arrival of a new message in one of three ways: an alert box that displays the sender's name and message title; an icon flashing in the menu bar; or telephone-like rings. The program requires a minimum 512k of RAM and an AppleTalk or compatible network. *Interactive Network Technologies, Inc. (Internet), 20 Amy Circle, Waban, MA 02168; (617) 965-5239; InterMail is site licensed, and pricing is de-*

terminated by the number of network users: 1-4 users, \$299.95; 5-10 users, \$499.95; 11-20 users, \$749.95; and 21 or more users, \$949.95; retail. (For additional product details, circle 329 on one of the Free Information Cards.)

KEEPTACK PLUS version 1.2 is a hard disk backup utility designed to offer several times the speed of the IBM DOS backup utility, with the added feature of integrated file management. Features of the program include: the incremental backup of the files worked on most recently; an include-exclude capability that tells the program to back up or not to back up specifically identified files; the ability to manipulate backup commands; the ability to copy, move, rename, delete, and change a variety of parameters for organizing backups; on-screen menus for simplified operation; restoration from batch files; and network backup. The memory requirement is 360k. *The Finot Group, 2390 El Camino Real, Palo Alto, CA 94306; (415) 856-2020; \$79 direct order. (For additional product details, circle 330 on one of the Free Information Cards.)*

KEYNOTES is a memory-resident utility package designed to act as an on-screen support program. According to the manufacturer, one keystroke puts the application on hold, guides the user to the necessary information through an on-screen window, and then restarts the application. The program serves as a combined documentation package, information-retrieval program, and built-in help system inside of IBM PC applications. Features of the program include: a word/key phrase search feature; and, according to the manufacturer, the ability to exchange text files with almost any word processor. The memory requirement is 35k. *Digital Learning Systems, Inc., 4 Century Drive, Parsippany, NJ 07054; (201) 538-6640 or (800) 992-0264; \$100 retail. (For additional product details, circle 331 on one of the Free Information Cards.)*

LOTUS EXPRESS FOR MCI MAIL is a communications package designed to enable users to exchange messages and application files with increased speed. The program can run as a RAM-resident or stand-alone product, and enables users to transmit any binary file from a spreadsheet, data base, word processing, or graphics program. The memory requirement is 256k in the stand-alone mode; 640k is recommended if it is run concurrently with another program. *Lotus Development Corp., 55 Cambridge Parkway, Cambridge, MA 02142; (617) 577-8500; \$100 retail, including a one-year MCI Mail subscription. (For additional product details, circle 332 on one of the Free Information Cards.)*

THE NON-VOLATILE RAM-DISK, a system designed to provide improved performance for disk-intensive applications, combines im-

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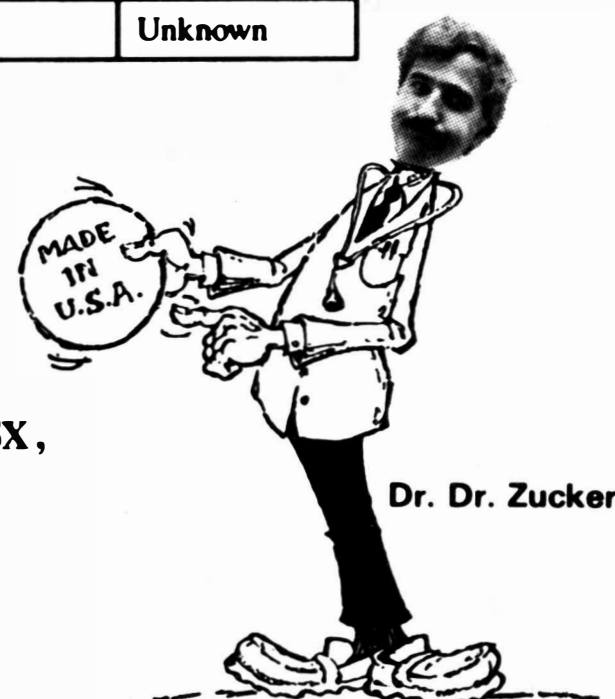
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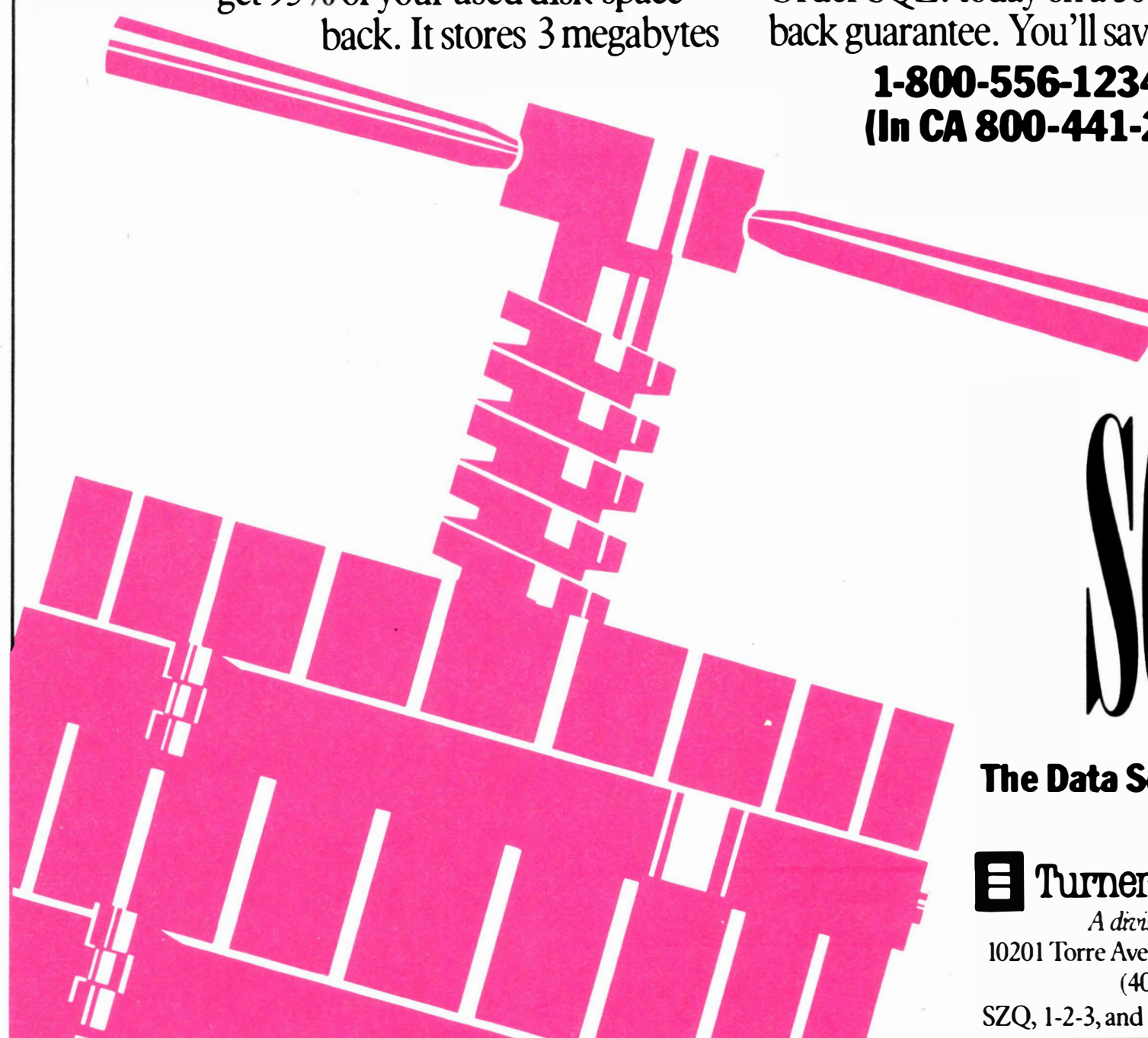
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PRODUCT LISTINGS

proved performance with the non-volatility of a hard disk. The non-volatile copy of the RAM disk is kept in a special file on the hard disk, called the backing file; the working copy is kept in expanded memory. The working copy is temporarily lost when the computer is booted, the manufacturer says, but the backing file remains valid. The working copy is recovered from the backing file and remains valid while the computer is operating. When a program writes to a non-volatile RAM disk, the non-volatile RAM disk updates both copies of the data. The program is designed to work with expanded memory hardware or with the Virtual Expanded Memory Manager (V-EMM). The memory requirement is 192k; an IBM fixed disk drive and fixed disk adapter, and EMS board or V-EMM (or both) are also required. *Fort's Software, PO Box 396; Manhattan, KS 66502; (913) 537-2897; \$49.95 direct order, or \$119.90 direct order, bundled with V-EMM. (For additional product details, circle 333 on one of the Free Information Cards.)*

OVERSEER is a program designed to take the place of the computer's operating system prompt. The package eliminates the blinking system prompt, directory paths, and program names. When the computer is booted, the manufacturer says, Overseer automatically presents up to 56 of the programs contained on either the floppy or the

hard disk. The names of all 56 programs are displayed on the screen for easy selection by number. Once a program is chosen, Overseer loads and runs it. When you're finished with the application, Overseer redisplay the program list and waits for another selection to be made. The memory requirement is 20 to 30k (stand-alone) or 100k (RAM-resident). *MTI Software, a division of Morton Technologies, Inc., PO Box 1659, 600 B St., Santa Rosa, CA 95402; (707) 523-1600 or (800) 624-1197; \$18.75 retail. (For additional product details, circle 335 on one of the Free Information Cards.)*

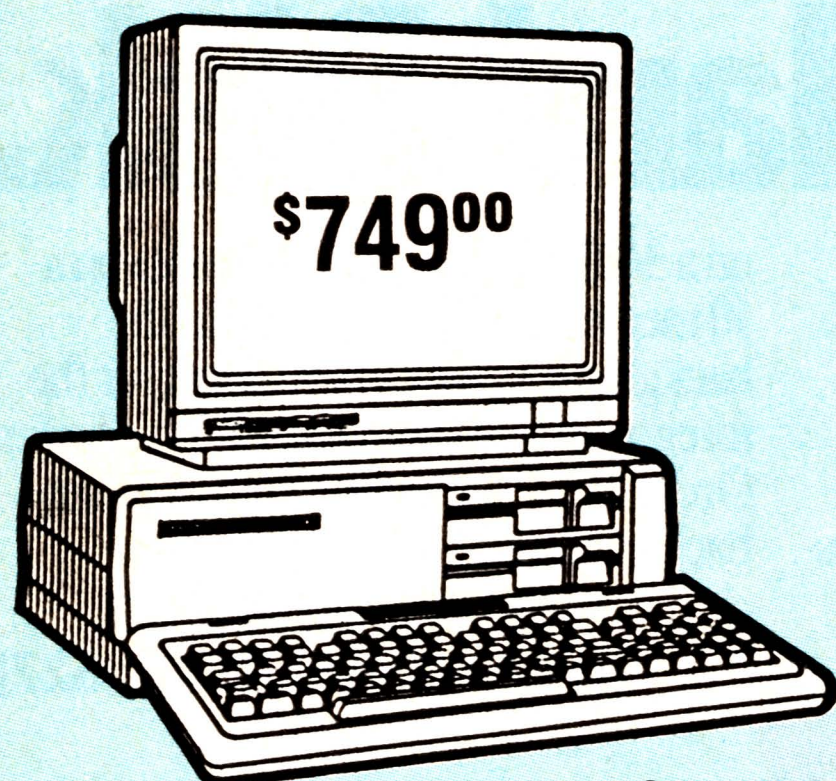
PCEASY is a pop-up file storing and retrieval utility designed to provide an easy method of organizing information. The user can enter up to 32 characters, including spaces between words, punctuation and upper- and lowercase letters to label a file. According to the manufacturer, the program alleviates other DOS difficulties by using the following methods: the program organizes the hard disk by using a filing cabinet system where each subdirectory is called a drawer, a sub-subdirectory is called a folder, and a file is simply a file; file retrieval is performed by keying in the first letter of the selection or by using a highlighted bar pointer. The program also includes a DOS shell main menu, designed to enable the user to select DOS commands, programs, and batch files by pointing to the option on the menu. DOS

commands are automatically entered by the program, and applications located on the hard disk are loaded automatically. The memory requirement is 256k. *Transec Systems, Inc., 220 Congress Park Drive, Suite 200, Delray Beach, FL 33445; (800) 423-0772 or (305) 276-1500; \$74.95 direct order. (For additional product details, circle 336 on one of the Free Information Cards.)*

PRINTKEY version 1.1, is a printing utility package designed to provide access to the features of any printer from within any software program. Features of the program include more than 250 prewritten drivers that provide access to the features of laser, dot matrix, daisywheel, and ink jet printers; and a macro editor for modifying or creating new drivers. The memory requirement is 24k. *NorthWest Software Associates, 12469 East Olive, Spokane, WA 99216; (509) 928-2361; \$89.95 retail. (For additional product details, circle 339 on one of the Free Information Cards.)*

PROJECT PCB is a computer-aided design (CAD) package designed to provide schematic capture, board layout, and auto-routing capabilities. Features of the program include: user-definable schematic and silk-screen symbols; user-definable footprints to .001-inch accuracy; block move; copy and delete functions; screen display of unrouted traces on the board; tag and drag function in interactive routing mode; four-

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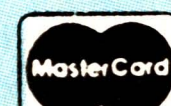
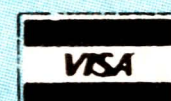
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PRODUCT LISTINGS

layer boards; two signal layers plus internal planes; single net or full board auto-routing; plot routines for camera-ready artwork; and predefined libraries of parts and symbols. The memory requirement is 640k; a monochrome, Hercules, AST or equivalent adapter, or IBM Color Graphics Adapter or Enhanced Graphics Adapter, and a Mouse Systems, Microsoft, or AT&T mouse are also required. *Dasoft Design Systems, Inc.*,

PO Box 8088, Berkeley, CA 94707-8088; (415) 486-0856; \$950 direct order. (For additional product details, circle 340 on one of the Free Information Cards.)

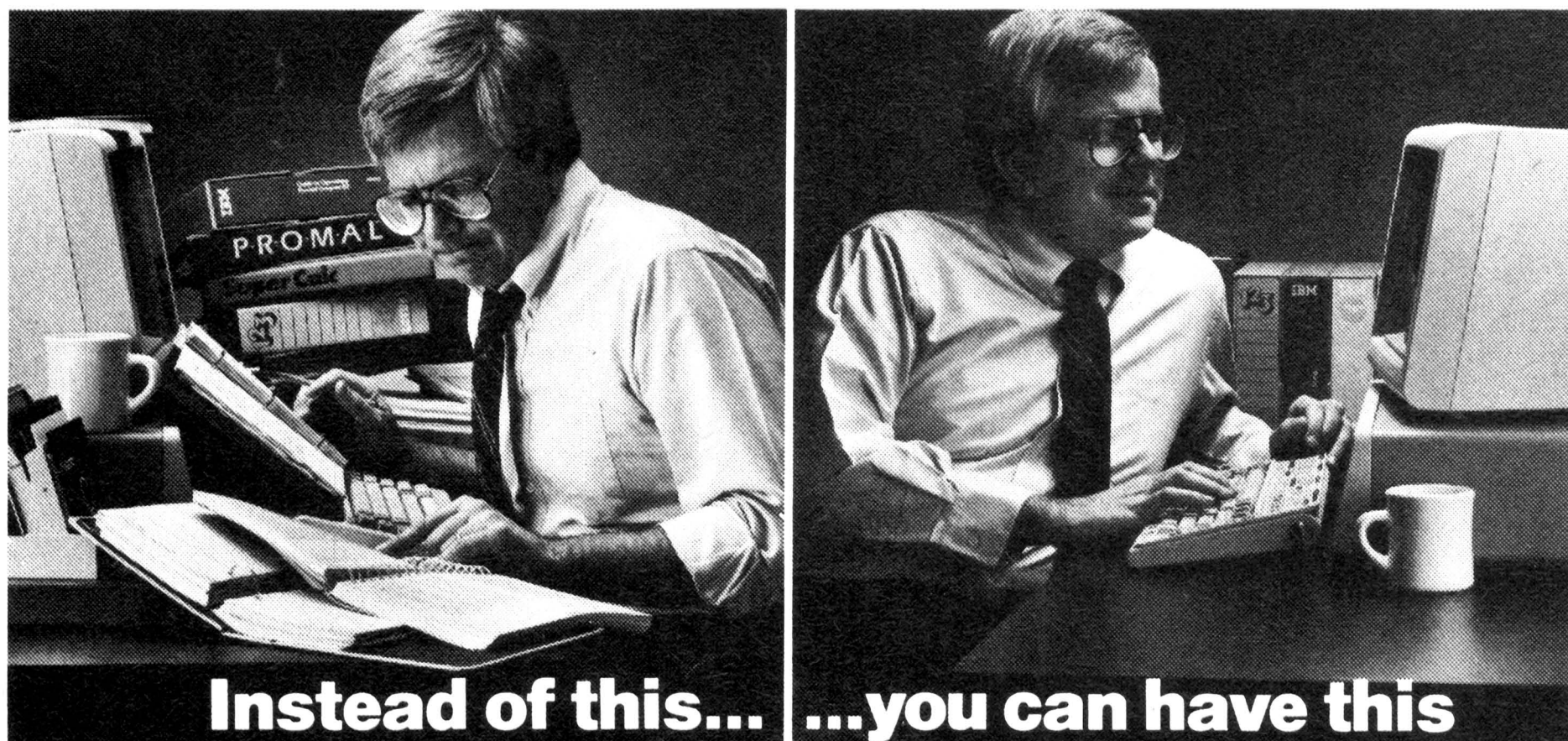
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the user establishes. Prospect Tracker stores company name and address, client status, publications mailed, in-house contact(s), last contact date, next contact date, and comments. The program has the ability to provide the user with callback checklists. The memory requirement is 256k. *MTI Software, PO Box 1659, 600 B St., Santa Rosa, CA 95402; (707) 523-1600 or (800) 624-1197; \$225 retail.* (For additional product details, circle 341 on one of the Free Information Cards.)

PC IMAGE is an image processing package that can run under Microsoft Windows and support most popular desktop publishing programs. Functions of the program include: scanner support drivers, including the JetReader feeder scanner and Model 730 platen base scanner; image file management, including save/load, file format conversion, compression/decompression; and image processing, including half-toning, thresholding, and scaling. PC Image will support Datacopy's standard .IMG image file format as well as PC Paintbrush 3.0. It will also support the Windows Tag Image File Format (TIFF). The combination of file formats will permit PC Image to be used with most PC-based desktop publishing software that accept images. The memory requirement is 640k. *Datacopy Corp., 1215 Terra Bella Ave., Mountain View, CA 94043; (415) 965-7900; \$495 retail.* (For additional product details, circle 337.)

SOFT LEATHER SALES ASSISTANT, a record-keeping package for sales professionals, is designed to organize files, remember appointments, and help the salesperson maintain an accurate prospect and mailing list. Functions of the Sales Assistant include: creating and revising prospect lists; sorting through prospects by location, type of business, or other factors designated by the user; maintaining a perpetual appointments file; reminding the user of scheduled appointments up to one week in advance; generating labels from the mailing list; and creating reports on any standard printer or on-screen. The memory requirement is 256k. *Planet Computer Services, 5600 Roswell Road, 118 Prado West, Atlanta, GA 30342; (404) 843-2527; \$149 retail.* (For additional product details, circle 343 on one of the Free Information Cards.)

SOLVEIT version 1.3, a numerical problem solving system, is designed for scientists and engineers who need to solve complicated numerical problems. Features include: sketching of functions; four sophisticated methods of numerical integration; and root finding and data analysis. The problem solving environment is represented as an RPN calculator. SolveIt can be used in the same way as a calculator, but it has more features, such as the ability to build any number of custom calculators that can be used for specific scientific, engineering or business applications. According to the manufacturer, the user can arbitrarily sketch complicated functions, solve the functions over the desired range, and can also build very large macros. Newly added features include data scattering, differential equation



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(For More Information Circle 201)

solving, Hercules graphics compatibility, and program editing. The memory requirement is 512k. *Structured Scientific Software, Inc., PO Box 7011, Bend, OR 97708; (503) 389-1847; \$79 retail. (For additional product details, circle 344 on one of the Free Information Cards.)*

UNISON FONTPAK, a set of five fonts for use with the Unison Author Language, has italic, round, deco, digital, and hollow typestyles. The Unison Author Language is a programming language that's designed for the production of computer-based training materials. Among the features of the language are graphics with color and animation, response analysis, and the ability to control devices such as a mouse and videodiscs. The memory requirement is 256k. *Courseware Applications, Inc., 475 Devonshire, Champaign, IL 61820; (217) 359-1878; \$49 retail. (For additional product details, circle 347 on one of the Free Information Cards.)*

LEISURE

THE CHESSMASTER 2000, for the Macintosh, is a chess program with 20 different levels of play, from neophyte to grandmaster. Included in the program is a chess algorithm and an opening collection of more than 71,000 moves. Other features include a teach mode that enables The Chessmaster to demonstrate moves, two- and three-dimensional graphics, and a window that displays captured pieces. The program has on-screen clocks, and joystick and mouse control. The memory requirement is 512k. *The Software Toolworks, One Toolworks Plaza, 13557 Ventura Blvd., Sherman Oaks, CA 91423; (818) 907-6789; \$44.95 retail. (For additional product details, circle 348 on one of the Free Information Cards.)*

COMPUTERIZED GARDENING, for the Macintosh, provides gardening information and plant lists by both scientific and common name. All the data is organized by zip code for the user's specific gardening climate. After you enter a zip code, the program enables you to: select categories for flower color, growing conditions, watering requirements, plant height, and blooming season; access a computerized plant encyclopedia; call up a planning calendar and diary; and access a calculator to determine garden and landscape dimensions. The memory requirement is 128k. *Ortho Information Services, 575 Market St., San Francisco, CA 94105; (415) 894-1981; \$49.95 retail. (For additional product details, circle 349 on one of the Free Information Cards.)*

DGI WORD SEARCH PUZZLE enables the user to create custom word-search puzzles. The user enters one to 40 words and the program creates the puzzle. The program is menu driven and enables the user to create puzzles in any size from 15-by-15 to 20-by-40 characters. The memory requirement is 128k. *Decision Graphics, Inc., PO Box 2776, Littleton, CO 80161; (303) 796-0341; \$25 retail. (For additional product details, circle 350 on one of the Free Information Cards.)*

HOLLYWOOD HIJINX, for the Macintosh, is an

interactive fiction game in which you have the starring role in a feature produced by your Hollywood mogul uncle, Buddy Burbank, and his wife, Aunt Hildegard. The production is not a movie, but rather an adventure in which you attempt to inherit their estate. You can claim your inheritance if you find 10 treasures hidden throughout their sprawling Malibu mansion. You lose the inheritance if you can't find all of the treasure in one night. The Malibu mansion is pure Hollywood—a gaudy round bed, bathroom faucets in the shape of Oscars, and a private screening room. The "treasures" you seek are props from old Buddy Burbank films. The memory requirement is 128k. *Infocom, Inc., 125 Cambridge Park Drive, Cambridge, MA 02140; (617) 492-6000; \$39.95 retail. (For additional product details, circle 351 on one of the Free Information Cards.)*

LOC, for the Macintosh, is a program that includes four strategy games played on a hexagonal game board; the four games are Loc, Match, Simple Match, and Catch Me. You can play against other people, against the computer at various skill levels, or have the computer play against itself. Players of any game can choose their pieces from more than 50 that come on the disk, most of which are animated. They can also use the piece editor to change any existing pieces or create new ones. The memory requirement is 512k. *Great Wave Software, 104 Gilbert Ave., Menlo Park, CA 94025; (415) 325-2202; \$49.95 retail. (For additional product details, circle 352 on one of the Free Information Cards.)*

PURRSONAL CHALLENGE is a trivia game run by a cat named Trivia Kitty. Players have a choice of personalities they can assume; most are not friendly, and some are designed to be insulting. These game personalities include Nagging Nellie, Mean Marty, Sexy Sadie, Wiseguy Willie, Hippy Harry, Charming Charlie, and Sweet Sue. The personalities are frustrated musicians who hum tunes in both appropriate and inappropriate places. One to six players can choose a subject area, and then answer a question in that area. The questions are multiple choice, and the computer makes comments on the answers given. The memory requirement is 256k. *Softworks, Inc., 100 Varick St., New York, NY 10013; (212) 219-2812; \$24.95 retail. (For additional product details, circle 353 on one of the Free Information Cards.)*

STAR FLEET1—THE WAR BEGINS is a strategic space simulation in which players become members of the Alliance and protect its outer reaches against the invading fleets of hostile aliens. Players belong to the Star Fleet Officers Academy. Each new level in the academy gives players the opportunity to assume the role of characters and experience tasks unique to the training level. The package contains an academy training manual and an officers' manual. The memory requirement is 128k. *Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; (415) 571-7991; \$49.95 retail. (For additional product details, circle 354 on one of the Free Information Cards.)*

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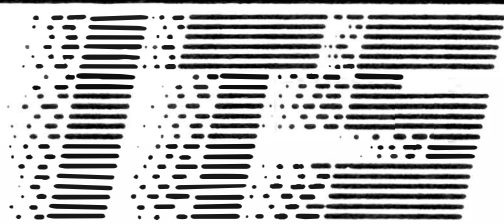
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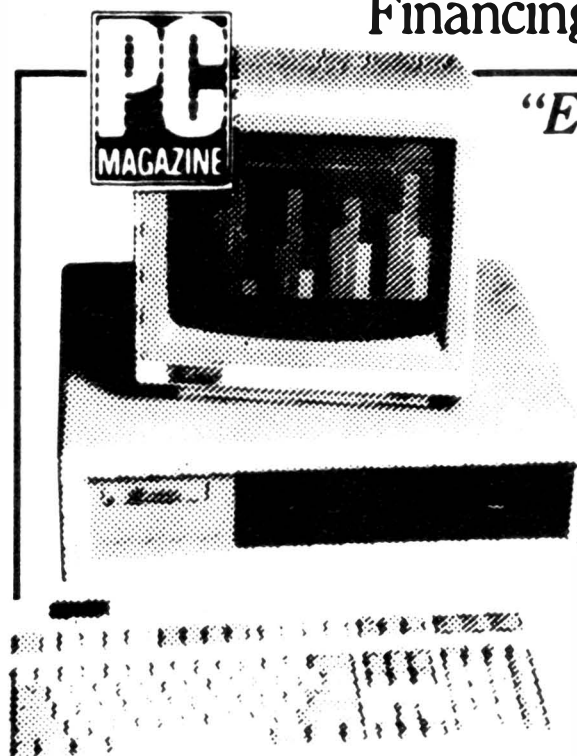
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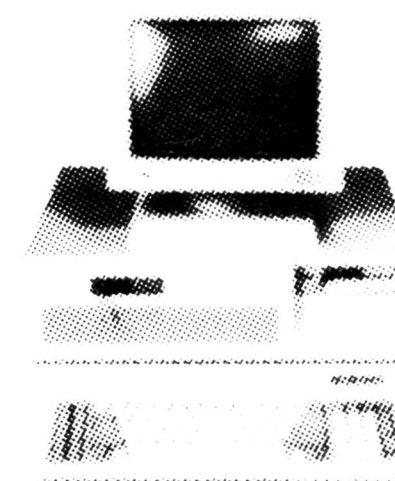
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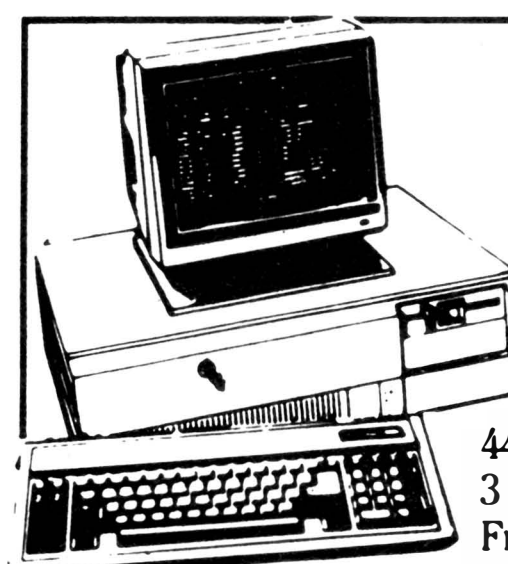
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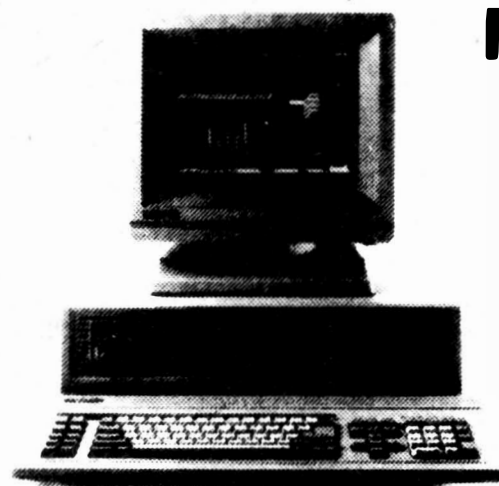
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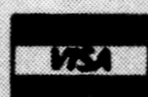
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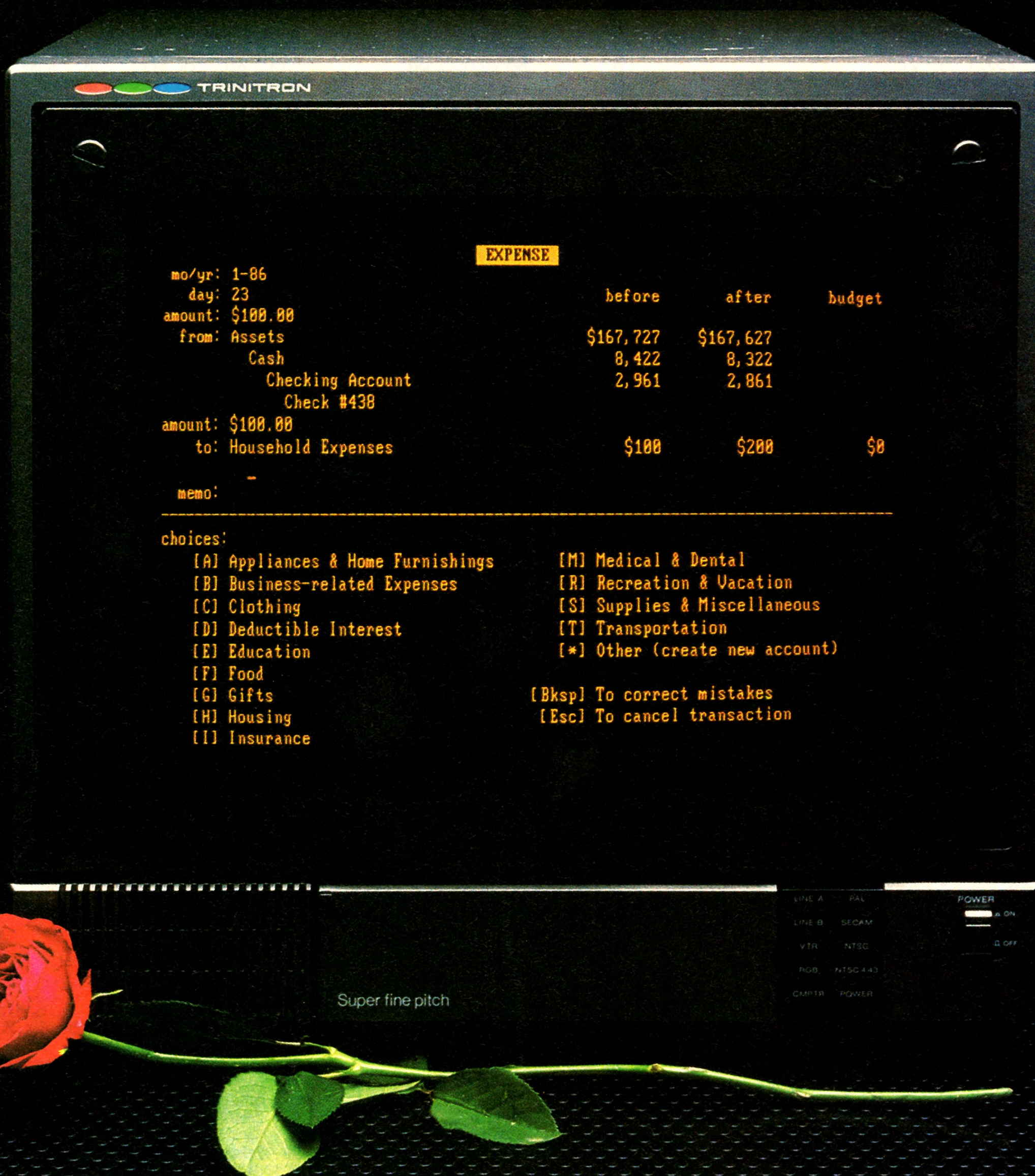


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Safeguarding A Hard Disk

Q: In the November 1986 issue of *PERSONAL COMPUTING*, I read about using batch files to avoid accidentally formatting a hard disk. I recently added a hard disk to my computer and made the mistake of using the `DEL *.*` command while in the C drive. Is there a batch file or other method I can use to prevent this problem from happening again?

A: When you issue the `DEL *.*` command, DOS asks you if you are sure you want to perform the command. It is all too easy to answer in the affirmative without first checking to see if you are in the proper drive or directory. You can write a batch file that offers additional layers of protection before the `DEL *.*` command is executed. Unfortunately, you can't simply modify the `DEL` command. The batch file detailed here incorporates the `DEL` command, but must be executed by typing the name of the batch file and not the `DEL *.*` command. You can still use the `DEL` command, but you will only be asked once if you are sure you want to proceed.

You create batch files by using the `COPY CON` command or the `EDLIN` command in DOS or by using your word processor, provided you can save the file in ASCII format. Using the `EDLIN` command or your word processor is a better option if your file is more than a few lines long, since these two options enable you to edit any line of the file. With `COPY CON`, however, there's no way to edit the contents of a line once you move to another line. `COPYCON` is a fast and simple way to write short files, though, and is probably the best method for them.

Here is what the batch file looks like, beginning with typing in the `COPY CON` command:

```
COPY CON SAFE.BAT <CR>
PATH \ <CR>
REM THIS COMMAND DELETES THE CONTENTS OF YOUR
DISK OR DIRECTORY <CR>
REM MAKE SURE YOU ARE IN THE PROPER DIRECTORY OR
DRIVE BEFORE CONTINUING <CR>
REM IF YOU ARE CERTAIN THIS IS THE PROPER DIRECTORY
<CR>
PAUSE <CR>
DEL *.* <CR>
^Z <CR>
```

The first line of the file (`path \`) sets

SHORTCUTS

Transferring PFS Files

The item in the "Answers" section of the December issue of *Personal Computing* about converting files from PFS:File to another Macintosh data base program caused me to dig out my method for transferring files from PFS:File and PFS:Professional File for MS-DOS computers to other formats.

If you have access to PFS:Write, a delimited ASCII file can be generated using the mail-merge feature, printing a one-page document for each record. For example, the text should appear as follows:

```
"FIELD NAME 1","FIELD NAME 2"
```

Note also that you are not limited to two field names. The top and bottom margins should be set at zero, the left margin at one, and the right margin at 78. Unfortunately, the maximum left margin on the MS-DOS version of PFS:Write is 78 (255 in Professional Write), so this will limit the length of files that can be created. It will work well if there are a large number of fairly small files to be copied.

Mail-merge can also be used to create a delimited ASCII file that duplicates one of the fields (a feature that PFS: Professional File does not have). I discovered this when restructuring files to duplicate a field in the first position for faster search/sort, while leaving the same information in another field in the correct position for printing mailing labels. (PFS requires that the file fields be in the same order as they are printed on the label.)

If the records are too long to fit in the maximum line length permitted by PFS:Write or if PFS:Write is not available, another alternative is to use the label print option on PFS:File, setting page length at one and printing to a disk file. This will create an ASCII file with two spaces between each field. You must be careful with this operation because null fields will not be printed and a delimited ASCII file should show " ". Any null fields should be filled with something.

The file can then be "fixed" using any word processing program. A search/replace feature makes this much easier, particularly one with a wild-card function that will permit a search for "?", replace it with "", and then inserting the quote mark at the beginning and end of each line. This may not be the most satisfactory solution; however, it's preferable to spending between \$50 and \$150 for new software, and is certainly faster than keying in all the files again.

You may also want to do a bit of experimentation in setting up a delimited ASCII file with a few records to get a feeling for what works.

*Richard Wallace
Spartanburg, SC*

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up a PATH command to find the batch file, which we put in the root directory, regardless of the directory we are in. The PATH command enables us to activate the batch file from any directory. If we didn't have the PATH command, we would need to copy the file into every directory. That is because there are two types of DOS commands—internal and external. Internal commands, such as DEL and COPY, are RAM resident and are available from any directory. External commands, such as batch files and the FORMAT command, are not RAM resident and therefore must be executed from the disk.

The second, third, and fourth lines in our batch file explain what the command is about to do. REM at the start of each line tells DOS not to interpret the line as a command. These lines provide fuller protection than the DEL *.* command, which simply asks, ARE YOU SURE? Y/N. The PAUSE command puts a message on the screen telling you to strike any key when ready. This gives you ample time to digest the remarks in lines two through four. Line six leaves you just short of actually activating the command. As a final check, you are asked ARE YOU SURE? Y/N.

The ATTRIBUTE command offers another method of protection. To use this command, type ATTRIB +R followed by the name of the file. To be able to write to and delete a file you've protected with this command, type ATTRIB -R followed by the name of the file.

Q: *I use an IBM PC AT at my office, with a Hayes 1200-baud modem and Smartcom II for communications; at home I use an IBM PCjr. What do I need for setting up communications between the two machines?*

A: You will first need to purchase a 1200-baud modem for your home computer. Because Hayes does not manufacture software for the IBM PCjr you should then consider either public domain or shareware communications software. Most public domain software

is available from local bulletin boards or from a PCjr users group in your area. If you download a public domain program, you're free to use it without paying a fee. If you go the users group route, chances are that you'll have to pay the price of a floppy disk to obtain the program. Shareware programs are similar to public domain software, but with a key difference. You're free to try a shareware program, but if you decide you want to keep it and use it, you are then required to pay the author a license fee (generally about \$25), for which you will receive a manual and technical support. One shareware program of note is Procomm, available from PIL Software Systems, PO Box 1471, Columbia, MO 65204.

The communications software you obtain will make it possible for you to transfer files between the two systems. If you don't know where to connect to a bulletin board, ask for assistance at your local computer store or call a users group in your area.

Q: *I own a Tandy 1000 computer with 256k of RAM, and two disk drives, and I use a Tandy DWP 210 daisywheel printer. When I use WordStar, version 3.31, the printer obeys all the commands, but gives a couple of extra rolls, up and then down, of the platen at the beginning and at the end of each line. What's the problem?*

A: Both Tandy and MicroPro, the manufacturer of WordStar, independently reached the same conclusion. The first thing that you need to check is whether or not you have the Tandy version of WordStar 3.31. To do this, you must look at the catalog number on your version; if the number is 2503170, you have the version that supports Tandy printers.

Second, make certain that you have run the install program correctly. Because the Tandy DWP 210 is not directly supported in WordStar version 3.31, you will have to run the custom installation option included in the printer setup section. Within the custom installation, the program will ask you a number of questions about the Tandy DWP 210 printer; the answers can be found in the printer's manual. If you don't have the manual or are having problems running the custom setup, Tandy suggests calling them directly at the Tandy hardware line, (817) 338-2394.

Finally, if you don't have the Tandy version of WordStar 3.31, MicroPro says that you must go to the setup pro-

gram and use the custom installation feature. You must first install for standard backspacing and then set the customization of printer feature. To do this, you must change the return line feed by changing the 0-A switch on the printer to 0-0. The return line feed should now read 0-D and 0-0.

Q: *I am looking for an on-disk collegiate dictionary that will enable me to type a word, press a key, and get a definition displayed on the monitor screen.*

A: Aren't we all! It certainly sounds good, but unfortunately, to the best of our knowledge, no dictionary of this type yet exists. Don't be fooled by the software titles that include the word "dictionary"—they really mean a spelling checker, a very useful tool, but not a dictionary with definitions.

We can't find anything resembling a stand-alone on-disk dictionary. Simon & Schuster Software, which makes the excellent Webster's Thesaurus, doesn't have any immediate plans for one. The Random House School Division, maker of the Random House Reference Set, a combined "dictionary" and thesaurus, has no plans for one either, but it is currently doing research on the possibility of marketing a true on-line dictionary. It should also be noted that the thesaurus included in Ashton-Tate's Multi-Mate Advantage provides a definition and labels the part of speech of each word it finds a synonym for. Since it doesn't give the etymology (word origin) or a list of definitions, however, it shouldn't be considered a full-fledged dictionary.

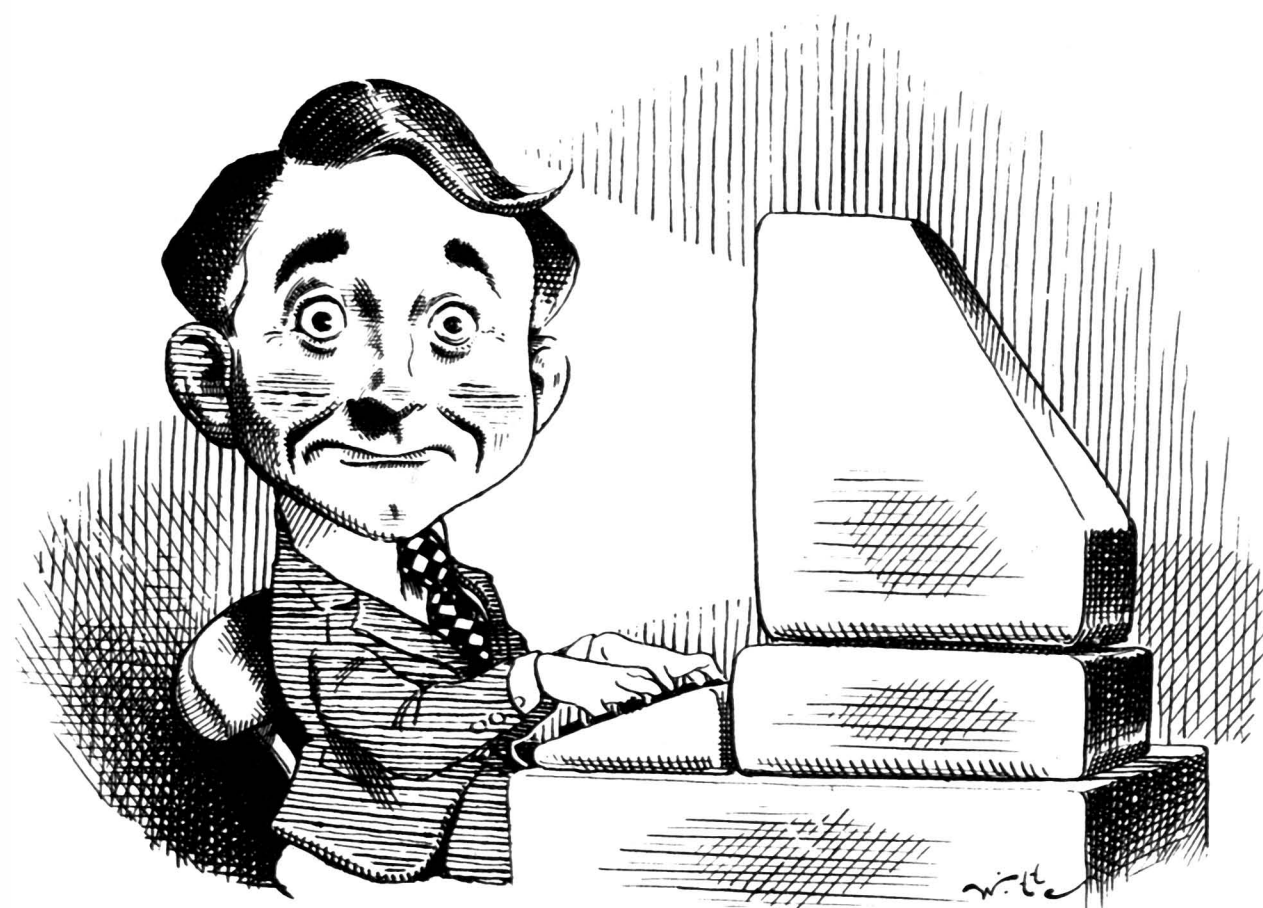
Q: *The "Speeding Hard Disk Access" story in the September issue states that the cluster size on a 360k floppy is 1,024 bytes. Later in the article, the size is listed as 4,096 bytes. Which of the two sizes is correct? Also, what is the size of a cluster on a hard disk?*

A: The cluster size on a 360k floppy is 1,024 bytes. A cluster is made up of sectors. A sector always contains 512 bytes. Although a sector is always the same size, the size of a cluster varies, depending on whether you have a 360k or a 1.2Mb floppy or a 10Mb, 20Mb, or higher-capacity hard drive. A cluster on a 360k drive, for example, is made up of two sectors, or 1,024 bytes. The cluster size on a 1.2Mb floppy is the equivalent of one sector, or 512 bytes. Hard disk clusters can vary in size: eight sectors (4,096 bytes) is common on a 10Mb drive, and on 20Mb drives they can be

If you have questions dealing with hardware or software, PERSONAL COMPUTING will answer them in this monthly column. Because of the volume of questions received, it's unfortunately not possible for us to send individual responses to each question. Send your questions to Answers, PERSONAL COMPUTING, 10 Mulholland Drive, Hasbrouck Heights, NJ 07604. Please include your address and your daytime telephone number.

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made up of four sectors (2,048 bytes) or as many as 16 sectors.

A simple experiment will show you what size cluster your hard disk has, and why cluster size is so important. Take a directory listing (C>DIR) of your root directory. Write down the number of free bytes. Then make a small file, perhaps containing a single character. Save the file. Take another directory of the root. Now notice the number of bytes free. If you subtract this number from the number of free bytes you had before you made the file, the resulting number will be your cluster size.

A file, no matter what its size, uses at least one cluster. Suppose your hard disk is set up so that 16 sectors are in one cluster. In this case, each cluster equals 8,192 bytes. A file that is only one character in size will, when saved, reduce the bytes you have available by 8,192. A file of that same size, saved on a hard disk with four sectors to each cluster, will only reduce the bytes you have available by 2,048. Thus, you are using the space on your hard disk more efficiently when the cluster consists of fewer sectors—this is something you should keep in mind if you're shopping for a hard disk.

It is deceiving to look at the byte count next to a file in a directory listing of the root area because even if the file is only 128 bytes, it can still occupy up to 8,192 bytes.

Q: *I would like to know how to print graphics using Lotus 1-2-3 on an IBM PCjr. When I try to print the graphs I create I get a "not enough memory" message—even though I have purchased additional memory. What gives?*

A: The source of the problem could be with the amount of memory in your system, the configuration of the 1-2-3 program, or a difficulty with the graphics fonts. The minimum memory required to run 1-2-3 on the PCjr is 256k, which you probably already have if you've added memory to the 128k of RAM that the PCjr comes with. Make sure you are using the setup program that comes with the memory upgrade to ensure that the system is "recognizing" this extra memory. Also, try using the CHKDSK command in DOS to see how much total and available memory it reports. If it's not about 256k, then the system is not recognizing the added memory.

Secondly, make sure that the 1-2-3 program is properly mated with your PCjr. It should be configured, for exam-

ple, to work with a color display and a graphics printer. Finally, the problem could be occurring because of an error with the graphic fonts. Because the PCjr has limited memory space it may be necessary to use a smaller font to print graphics. If all else fails, try calling the Lotus technical support group at (617) 253-9150.

Q: *Do any word processing programs have an automatic indexing utility?*

A: Yes. The latest versions of WordPerfect, Microsoft Word and WordStar 2000 all offer this feature, as do some other popular packages. Each will create an index for you through a designated series of steps. In WordPerfect 4.1, for example, you can create an index by marking blocks of text or by positioning your cursor to the word you choose for an index heading. You can create subtitles if you desire them. WordPerfect also allows you to choose from a menu of indexing styles. WordPerfect can alphabetize your index if you like. Version 3.0 of Microsoft Word and WordStar 2000 Plus offer similar functions, though the procedures for creating an index vary.

Q: *I've been having trouble getting my Tandy 1000 to boot up when the weather turns cold. Although I don't experience any problems during the rest of the year, when it's cold I sometimes get as many as eight boot failures before the computer will load DOS. What's the problem?*

A: As a general rule, your computer—like nearly every computer—needs to be at a temperature of between 65 and 85 degrees Fahrenheit (between approximately 20 and 30 degrees Celsius) to operate properly. If your computer is kept in the basement or in an office that is unheated when you are not working there, chances are that the internal parts will be colder than the recommended operating temperatures when you next try to boot the machine. It's a good idea to leave the machine on overnight (consider shutting it down over the weekend); simply turn the monitor off.

Q: *I have a Kaypro Model 16 with 640k of RAM. When I run Lotus 1-2-3 release 1A, I have more than 500k to work with on any given worksheet. The problem is this: Some of my worksheets still consume more than the available memory. Could you suggest some ways for me to use my available space more efficiently?*

A: According to the technical support group at Lotus Development Corp. in Cambridge, Mass., Lotus 1-2-3 does not

support Kaypro products and the company has yet to test ways for Kaypro owners to save valuable memory space when constructing worksheets. They did explain why Lotus 1-2-3 release 1A consumes as much memory as it does. The Lotus staff claims that the problem lies in the software. Let's say you want to create a worksheet with columns A-E on the horizontal axis; and columns 1-5 on the vertical axis. If you place a numerical value of 300 at point A1 and then another value, 500, at point E5, leaving all points in between empty, Lotus 1-2-3 release 1A will store the entire block from A1 to E5 instead of merely saving the columns containing a value. In turn, valuable memory space is consumed that could be saved and used for longer worksheets; the end result is a shortage of available memory.

There's a simple solution when using the more efficient 1-2-3 release 2.0. If you took the same example as mentioned above, release 2.0 would only open the cells in the columns in which there was a value; in this case columns A and E. If you made another chart in which there was a value at those same points and at the additional points (B1, C1, and D1), release 2 would open up all the cells in columns A and E while only opening cells B1, C1, and D1 in the other columns, saving a large portion of available memory.

Adding expanded memory to your system would not be a solution to your problem, since Lotus 1-2-3 release 1A does not work with expanded memory; release 2.0 does work with expanded memory cards.

To upgrade your current version of Lotus 1-2-3, call Lotus' upgrade department at 1-800-TRADEUP. They will send you a mailer that contains an order form and a return envelope in which you will have to return one disk of version 1A, along with \$15. Lotus suggests that you send your disk by registered mail to ensure its delivery.

Q: *Would you please print the address of Scarsdale Technologies, Inc.*

A: Scarsdale Technologies, a manufacturer of vertical-market software, is located at 238 King St. E., Toronto, Ontario, Canada. The telephone number is (416) 369-0332. ■

CORRECTION

In the January 1987 issue, reader Walter Norman's letter to the editor should have described his department using Compaq Deskpro 286s.

AD INDEX

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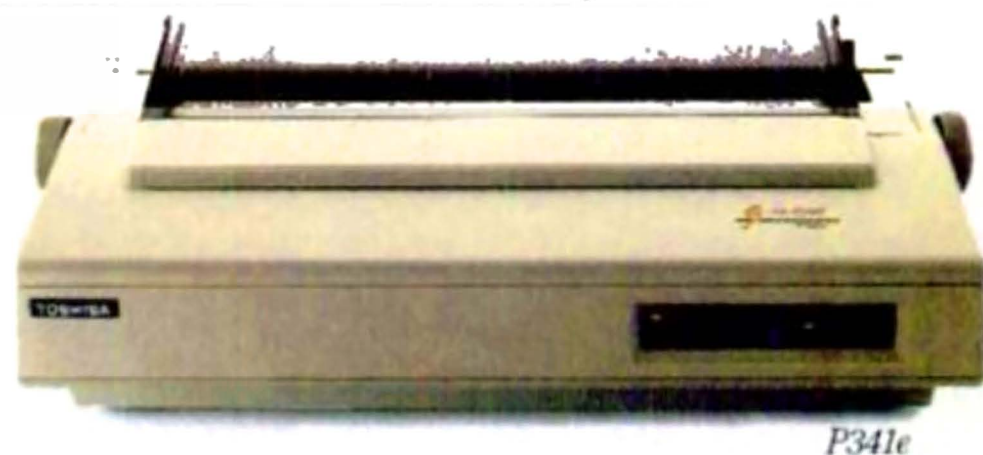
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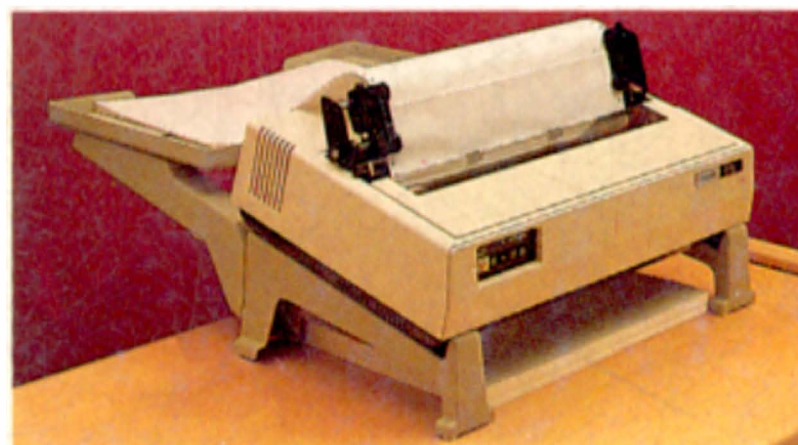
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